MECHANICAL ENGINEERING

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DURING THE
ANNUAL MEETING
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Roy V. Wright

Paul Doty

Thomas A. Boyd

HOTEL ASTOR

SIX THIRTY O'CLOCK DECEMBER THE SECOND

John V. W. Reynders.

C. [illegible]

VOLUME 59
No. 1

MECHANICAL ENGINEERING

JANUARY
1937

GEORGE A. STETSON, *Editor*

An A.S.M.E. Issue

THERE is little in this issue that does not concern directly The American Society of Mechanical Engineers and its members. Mr. Batt's critical views on Society affairs, the reports of the Council and Finance Committee, the accounts of the 1936 Annual Meeting and the Swasey dinner, and the A.S.M.E. News all have a definite meaning to members and, it is hoped, will bring to those remote from New York a broad and clear picture of the activities they support. Where one member touches the Society's work at one point, hundreds of others have hundreds of other contacts. Only through the publications do all share alike and hence through MECHANICAL ENGINEERING the greatest number can be reached in a way that may make all conscious of certain important aspects of a tremendously varied program of efforts and interests.

To readers who are nonmembers may we point out that the technical papers with which these pages are customarily filled can be published only so long as the Society organization has vitality and a membership that will concern itself with countless services for the good of the profession. This glimpse of their numerous activities is an evidence of that vitality.

To student members we hope may come a broader understanding of the organization in which they will some day take places of leadership. Remote as many of the persons and affairs here mentioned may seem today they are, in reality, closer to the experience of college life than may be thought. For when the exciting life of the campus is past it may be followed by worth-while and satisfying experiences in a professional engineering society. To know something of that society is an obligation an engineering student owes to himself.

A Working Council

LAST March W. L. Batt, in his "President's Page" in MECHANICAL ENGINEERING, announced the appointment of "senior councilors" from among the members of the Council of The American Society of Mechanical Engineers whose duty it was to represent him and the Council by means of frequent personal contacts with the sections and members of the Society.

Mr. Batt's plan worked so well that President Herron has announced his intention of developing it further, and has asked for consideration of a suggestion made by a new member of the Council, K. H. Condit, that other Council members be assigned to serve in a similar manner the needs of the professional divisions.

The scheme of assuring the active and continuous service of members of the Council in addition to that rendered in attention to Society affairs at the few formal meetings of the Council will appeal to every one as being decidedly worth while and productive of useful results. With one group of Council members already convinced of the value of the function of the senior councilors, who are concerned with general Society contacts on a regional basis, the establishment of another group sympathetic to the development of technical interests through personal representation of the divisions holds promise for a more vigorous professional society with more closely coordinated ideals and programs.

Four Score Years and Ten

ONE of the amazing facts about industry and engineering is the tremendous advance that has taken place in the ninety years covering the span of Ambrose Swasey's life. Changes too drastic to be easily summarized and of which most persons are ignorant have come over our mode of living, our material welfare, and our social institutions, for in those ninety years the fullest impact of the industrial revolution has been felt.

The world into which George Westinghouse and Ambrose Swasey were born presented a unique opportunity for the exercise of their extraordinary talents. It should not be a matter of regret that the opportunities they faced will never again be presented in just the same way as they found them. Men of such fiber and talent come to the top in whatever age they live! Only the details of their histories change. The profit to young men in contrasting 1846 with 1936 lies in a realization that even greater advances are ahead.

When Swasey and Westinghouse were in their cradles Macaulay was writing that classic third chapter of his history of England in which he looked back to 16[illegible] ad life under the Stuarts—to some of his contemporaries the golden age of England. But he ended that chapter by looking ahead—as, we hope, wise men do today. Said he:

> We too shall, in our turn, be outstripped, and in our turn be envied. It may well be, in the twentieth century, that the peasant of Dorsetshire may think himself miserably paid with fifteen shillings a week; that the carpenter at Greenwich may receive ten shillings a day; that labouring men may be as little used to dine without meat as they now are to eat rye bread; that sanitary police and medical discoveries may

have added several more years to the average length of human life; that numerous comforts and luxuries which are now unknown, or confined to a few, may be within the reach of every diligent and thrifty working man. And yet it may then be the mode to assert that the increase of wealth and the progress of science have benefited the few at the expense of the many, and to talk of the reign of Queen Victoria as the time when England was truly merry England, when all classes were bound together by brotherly sympathy, when the rich did not grind the faces of the poor, and when the poor did not envy the splendour of the rich.

Robert I. Rees

LAST month high hopes were expressed of the benefits to the engineering profession and to the Engineers' Council for Professional Development to be expected from a grant of the Carnegie Corporation that made possible the full-time services of Gen. R. I. Rees to the Council. While that issue was on the press, General Rees was stricken in Detroit, where he died before copies of MECHANICAL ENGINEERING reached their readers.

Such tragic swiftness has shocked General Rees's friends. No one believed more sincerely than he in the ideals and objectives of E.C.P.D. and few had given to it so much time and thought. The work he had set out to do was to have been a glorious climax to a career notable for services to youth, to education, and to the engineering profession.

At the close of the War, General Rees found himself the head of a unique educational institution, the "college" in France of the American Expeditionary Forces, that prior to demobilization of the troops sought to prepare for useful peace-time tasks men who had been engaged in military occupations overseas. When he returned to this country and to civil life General Rees devoted his talents to personnel problems for the American Telephone and Telegraph Company, where his work was with young men, and particularly with a concern for the post-collegiate training that puts to good use those critical years immediately following graduation. He became well known and highly respected and beloved by teachers of engineering through his services to the Society for the Promotion of Engineering Education, and he served that society as its president. Probably no man outside college walls was so highly regarded as he by those charged with the education of engineers.

His work for The American Society of Mechanical Engineers on its Committee on Meetings and Program is well known to members of that Society; and his active participation in the organization and program of the Engineers' Council for Professional Development had won for him the gratitude of the profession.

Young men especially have lost a friend who had a particularly acute understanding of their problems and who was constantly providing them with practicable means of self-improvement. Few friends of the engineering profession possess the broad constructive vision that characterized his approach to the humanitarian and educational problems of the industrial age. Engineers will be remiss in their appreciation of his unique services and personality if they do not devise some appropriate manner in which to keep his name alive.

Leon Cammen

TWENTY-FIVE years to the day from the time he joined the editorial staff of The American Society of Mechanical Engineers, Leon Cammen succumbed to a malignant growth that had been sapping his strength for more than a year. Earlier that same week acknowledgment of his quarter century of service to the Society had been recorded in the minute to be found on page 52.

Few members of the Society knew Mr. Cammen, but those who did not benefit from his services belong to that incurious company who have no interest in the trend of engineering, for it was his monthly task to provide abstracts in the English language of significant articles published in other periodicals. But to those who did know him he was an object for admiring respect. Men may lead adventurous lives, they may have extraordinary facility in languages, or they may have a scholarly and practical knowledge of science, engineering, and the cultural arts. But how few crowd into three score years as much of these as he did—how few can turn such knowledge to useful ends?

Coming to this country from his native Russia before he was thirty five, Mr. Cammen broke with a romantic and adventurous past, and scenes from this past gleamed fitfully in casual conversations with his friends without revealing the fascinating "continuity" of which they were a part. There were glimpses of danger and suffering in the arctic; of awaking in the chill dawn of Baluchistan with a giant lizard as an unexpected bedfellow; of strange Mongolian adventures; of palaces of popes and kings; of rifle contests between the crack marksmen of the most powerful emperors of Europe; of the main streets of European capitals and Asiatic no-man's lands. In odd bits of office talk would mingle the musical verses of Pushkin, Persian proverbs, a snatch of the Koran, a German old-wives' tale, or a French bon mot—spoken without affectation and with a keenly observant eye that twinkled with great humor. For here was a man who had been everywhere, who had known every one, who had been schooled at Oxford, who had discussed oriental philosophy with Tolstoi, who spoke of Artzibasheff and Sologub as real persons, and whose opinions of Lenin and Trotsky were formed by personal acquaintance.

Needless to say the richness and variety of early experiences cast against this background of Europe and Asia gave perspective and meaning to events and trends in social and scientific progress that men of provincial environments let pass unnoticed. To know such a man places a ferment in an ordinary mind that makes it seethe with critical speculations, and adds breadth and acuity to mental vision. Keen observation, intelligent analysis, retentive memory, inquiring imagination, restless curiosity about things and happenings enriched his life—tireless mental industry made double use of time. Young engineers can emulate these virtues to their profit.

On a gentle slope in Woodlawn his tired and wasted body rests in peace, but his emancipated spirit communes once more with philosophers and kings in full knowledge of the truth he so eagerly sought on earth.

A STUDY *of* A.S.M.E. AFFAIRS

A Running Commentary Based on Personal Observations, With Constructive Suggestions for the Future

By W. L. BATT

PRESIDENT, THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, 1936

IT IS the usual practice for the executive of a corporation to come before his stockholders at the time of the annual meeting and give to them an account of his stewardship during the preceding year. In addition to more or less detailed operating reports he may include such general comments as he may feel inclined to give to them on matters of broader interest than are covered by mere figures. Our Society has not been entirely immune from the practice, but it has been the custom of its past-presidents to deliver an address at the time of the Annual Meeting on some subject of broad professional interest. I have no such academic qualifications as many of our past-presidents and I intend, therefore, to confine my address to a discussion of some of the outstanding problems of the Society as they appear to me.

While I have not done an entirely complete job of visiting our sections and student branches, a circuit of 25,000 miles from the east coast to the west and from the Gulf to the Border has given me a fair cross section of the views of our members and I propose to leave the thinking that has grown out of these visits to you for any value it may have. It must be understood that these comments are purely my own—indeed they have been seen by no one save my secretary.

THE JOURNAL

In more or less random fashion let me first touch on the problem of the Journal.[1] It is the principal medium through which a large part of the membership of the Society can be kept in touch with its work. I am convinced that too few of our members read it; that is unfortunate, because those who do not read the Journal are not likely to get much from the other publications and they will be prone to feel that the Society is not doing enough for them. I have asked myself what changes should be made in the Journal to make it more readable.

Certainly in its form, in its printing, and also in its brief editorials it is difficult to improve upon. At one time it seemed probable to me that the Journal should partake more generally of a news character, but I can find no large support for this view. But whatever the means, the Journal must be made more popular and I am glad to note an improvement in this direction beginning with the October issue. More can be done. I am convinced that a large percentage of our members would like more general engineering articles as distinct from detailed technical papers. They would relish a review of papers which may be too mathematical, too abstruse, or too lengthy for them to absorb in detail; perhaps something in the nature of a "readers' digest" of significant technical contributions would express what is in my mind. A large percentage of our membership either do not have the time or the inclination to pursue an elaborate technical paper and they would like to know the high spots of that paper. To be more specific in my reference I should like to take the case of a paper given before our Society some years ago on the streamlined train. Now our readers are interested in the broad question here involved and most of them would like to know what this author's conclusions were, perhaps something as to how he arrived at them; but the paper, in the form in which it was presented, will be of interest to only a small portion of our membership.

JOURNAL SHOULD PUBLICIZE SOCIETY WORK

I feel that the Journal has failed to popularize these accomplishments of the technical committees of the Society. This can readily be understood when one considers the inability of most engineers to dramatize their work. But how desirable it would be if our members could know of the outstanding accomplishments of some of our technical committees and thrill with pride over their work. Can a member be blamed for lacking confidence in the wisdom of our committee expenditures when he does not know what those expenditures represent? My concrete recommendation therefore with regard to the Journal is that our editorial staff should be given larger leeway in itself contributing or securing articles of general interest to our members; in addition to this we should study the possibility of a reasonably comprehensive abstract of all papers presented before the Society. Let us consider the wisdom of referring to Transactions *all* papers of undue length and/or highly refined technical content. The objective would be a Journal which would enlarge the professional horizon of a great body of our membership and which would desirably be of such significance to them that the Journal would be one of the first publications which they would read, instead of one of the last.

[1] In referring to the Journal Mr. Batt has in mind of course MECHANICAL ENGINEERING, which is frequently so called.—EDITOR.

Presidential Address delivered at the Annual Meeting, New York, N. Y., Nov. 30 to Dec. 4, 1936, of THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

PROFESSIONAL DIVISIONS AND TECHNICAL COMMITTEES

The new program for five basic divisions seems to meet with general approval. Can we not make an enlarged effort to enlist the support of the most competent men in each field? Only in this way can the results of the work of our divisions receive the maximum support. The Professional Division is an excellent means of adding new members of desirable qualifications, and as financial conditions improve, the effort should be made to hold more Professional Division meetings in areas selected for member and industry interest. A few of us recognize that it is only through the work of professional divisions and technical committees that the boundaries of our profession are advanced, but we must admit that these professional accomplishments fail of some large part of their possible effectiveness if they are not sold to the membership body.

As a matter of fact many of our members cannot, for one reason or another, participate in this technical work, but all of them can have a share in the pride and satisfaction of its accomplishment. As I have pointed out earlier, research-minded men are not likely to have an interest in or flare for publicity, but some way can be found, if the idea is acceptable, to dramatize the outstanding and scientific technical work of the few to the many whose support is an essential requirement. I emphasize this not alone because of its direct value, but because of the educational and uplifting professional influence on the membership at large which such disseminated knowledge can have.

MEMBERS INTERESTED IN LOCAL SECTION WORK ARE NOT LIKELY TO BE AS KEENLY INTERESTED IN PROFESSIONAL DIVISION ACTIVITIES

For many years the precise distinction between Local Section and Professional Division interest had eluded me. I have heard the statement that they were one and the same members—on the one hand carrying on the technical activities of the Society and, on the other, conducting the programs of the Local Sections in their home localities. I have come to the conclusion that this is incorrect; that they are in the main two different groups of members with different interests and perhaps with different professional qualifications. To use two extremes, I can hardly picture the type of member active in the Applied Mechanics Division and equally active in Local Sections work. It seems, therefore, reasonable to assume that the Local Sections organization largely embraces men who for one reason or another are not active in the professional work of the Society; perhaps because of their inability to take part in such work because of distance, time, or expense; perhaps because of lack of interest in technical committee work. This type of member may have larger interest in the business side of engineering and industry, but may have difficulty in following the detailed mechanical paper and if the Journal carries too many such papers he is likely to be dissatisfied. It is for him that the technical accomplishments of the Society must be dramatized in understandable language and he will be found anxious to have pride in them if, without too much difficulty, he can understand them reasonably well.

I refer at length to this average member because I am convinced that he is in the numerical majority. Our efforts to keep him informed and to enlist his support should be enlarged. In particular, means must be found to maintain a closer contact with that member who is far away from the scene of Society meetings and whose contact with the real accomplishment of the Society and the profession is not too close. It does not seem unreasonable to suggest that the allotment of Section funds should make such a distinction.

THE WORK OF THE LOCAL SECTIONS

My sympathy goes out to the Local Section officers in neighborhoods where there are few members and diversified interests. On the same shoulders repeatedly falls the apparently thankless task of providing programs, of getting members to meetings, and withal, usually within limited appropriation. It is particularly to these Sections that I have advised a close cooperation with other engineering groups in their cities. Where there may be too few mechanical engineers to provide really effective Local Section work, there may be enough engineers of other interests who can, through a combination of effort, furnish a series of programs which will be of stimulating value.

I emphasize the opportunity before the Local Sections of work with the Student Branches if there are such in their neighborhood, and with the junior engineer. In some quarters the principal activity of our Local Section is to cooperate with the Student Branches and where this is being done well, it may represent an ample justification of the Section even if little else is accomplished. In most quarters the results of work with Junior Engineers have not been of large consequence; in some instances it has been because of a lack of understanding of what the relationship ought to be, and one reason for failure has been a too paternalistic attitude on the part of the older members. The Junior movement can only be made effective when it is truly cooperative and with no thought of paternalism; actually I surmise that our older members are getting fully as much of direct professional value from the Junior movement as they are giving to it.

Our Local Sections can be of real value in connection with unemployment. When men are in trouble or out of work, it is a tremendous satisfaction to be able to talk to some understanding person and contacts thus made are likely to be of far-reaching benefit. In some places I found this function of the Local Section has been effectively employed; but its value cannot be emphasized too much.

GROUP DELEGATES CONFERENCE

I have undergone a rather complete change of attitude toward the value of this institution, but I feel its real function is still misunderstood both by its advocates and those who honestly question its value. It was my earlier belief that the underlying objective behind the

proposal for the Group Conference was a desire to forcefully tell the Council how it should administer the affairs of the Society. There is no doubt that many of the more vigorous proponents of the plan had precisely that conception of its purpose. Thus far I do not conclude that the conference of Delegates either in its earlier form or in its present one has been of any considerable assistance to Council in its policy-forming function. The new organization of Regional Conferences is a great improvement over the old plan however, and promises a contribution of real value toward a closer unity within the Society. Too much attention cannot be given to the preparation of these Regional Conferences, for their success will largely depend on the effectiveness with which they are conducted. If they are to be merely safety valves, as useful as this function is, they will fall short of their possibilities. What are these possibilities?

(1) The Regional Conferees will, of course, have an opportunity to become better acquainted with each other and with their real local problems but, much more important, many of them will have their first opportunity to become "Society-minded"—to familiarize themselves with what the Society has done during the year and to renew their enthusiasm preparatory to a new year's work.

(2) If they will express their views concretely so that their delegates to the Annual Meeting may be able to give to the Council a measured cross section of the real thinking of the membership of the Local Sections, a valuable service will be rendered in the determination of Society policy.

(3) In return, these fourteen National Conference Delegates will be enabled to carry back to their districts a more or less complete picture of the work of the Society. If they go home uninformed as to our financial affairs, as to our professional accomplishments, or as to any other major interest, that will be most unfortunate. The Sections in each Group cannot give too much attention to the quality of members sent to these conferences.

STUDENT-BRANCH ACTIVITY

This has been one of the outstanding accomplishments of the Society and if it had done nothing else in the last five years, I conclude that its existence would have been justified by the larger concern which it has determined to take in stimulating the professional interest of the engineering student. Of all my contacts during the year, the contact with the Student Branches has given me the greatest satisfaction and I sincerely hope that the Council will give an attentive ear to the future needs of the Student Branch movement.

I wish we could have a larger control over the selection of the honorary chairman because without a good honorary chairman the chances of an effective Student Branch are small. He should be a man of inspiration and leadership, one who is willing to submerge himself in the professional development of the students with whom he is associated. Certainly he should be a member of the Society.

Next in effectiveness must, of course, come the chairman and other officers. Where they are ineffective or lacking in initiative, the work by their branch is likely to be inferior. I should like to emphasize that they ought to be invited to preside at meetings where members of the Society are to speak; the experience in introducing such speakers will be of value to them and I have regretted it when Student Branch officers had no outstanding part in some of my visits. Every possible effort must be made to enlarge the experience and professional interest of our student members, and this should be one of the principal concerns of our Senior Councilors.

As you will remember, the Senior Councilor is the oldest member of Council in point of service from each of the seven geographical divisions. It is his obligation to assist the President in establishing a closer contact between the Society and the Groups within his area—of bringing the views of each to the other, to the end that the program of the Society may be adequate to the need. There is no doubt in my mind but that some considerable part of such criticism as we have had over the last few years has come about because of the curtailed contact between the member and the administrative agencies of the Society. This has, of course, been largely the result of restricted finances and I hope that increased funds will make this problem an easier one in future years. Although we have had only a few months of experience with the plan of Senior Councilors, I am pleased with the results and recommend that the program should be continued. Aside from its obvious functions, it should also lighten the onerous travel burden now imposed on the President and enable him to give more time to the many vital questions incident to Society administration.

MEMBERSHIP

It is self-evident that the first step in maintaining the existence and vigor of our Society is to insure a continuous influx of new members. To do this we must first discover the engineers who are eligible for membership and who wish to join our Society. We must then select from among the applicants those whose professional records entitle them to membership.

To discover eligible engineers we rely principally upon the numerous local membership committees and upon the prestige of the Society which induces many persons to apply for admission.

But of equal importance in maintaining the high quality of the membership is the care used in selecting from among the applicants the engineers entitled to election and in assigning every one elected the grade of membership—junior, associate, member, or fellow—to which he should belong.

The A.S.M.E. Council is the final authority in electing and grading members, but it bases its decisions on the professional records of the applicants and on the comments of their sponsors. Every applicant submits his own professional record, but with the sponsors rests the responsibility of certifying the portions of it about which

they have personal knowledge. Sponsors are under obligation to provide the Committee on Admissions, upon whose recommendation the Council elects and grades members, with reliable, comprehensive, and unbiased information.

In discussing with the Committee on Admissions the problem of our method of selecting and grading members, I find that, in general, the information offered by sponsors of members being considered for promotion to a higher grade is not as comprehensive as that provided in the cases of new members. This is particularly true of comments on just why the promotion is recommended or on just what outstanding achievement it is based. The Committee on Admissions can make its recommendations to the Council with greater justice to the applicant and more positively in the best interests of the Society if the information provided by sponsors is genuinely comprehensive.

I am appealing to all members of the Society to consider the sponsoring of candidates for election and promotion as a responsibility vital to the best interest of the Society and to exercise the duties of sponsorship with thoughtful discretion. By providing comprehensive information to the Committee on Admissions sponsors are helping to safeguard the high quality of the Society's membership.

FINANCES OF THE SOCIETY

And now a brief summary of the financial results for the past fiscal year.

The total receipts of the Society for last year amounted to approximately $398,000, but of this sum $9000 repsented initiation fees which are not budgeted as a part of the year's income. Initiation fees were less this year by $7000 as compared with last year. The amount of money available for the year's operations was therefore $389,000 and this was $21,000 more than was available last year. Without too much detail it is important to note that advertising income increased by $16,000 while membership dues declined by $3450. Other income changes were nominal in amount.

Offsetting this the total expenditures of the Society for the year amounted to $368,000 and the Society was, therefore, able to lay aside approximately $21,000. This is not too much, for certain financial problems still confront us.

First it must be remembered that we are sending out dues bills 45 days in advance of the due date. We thus have the use of the members' money for 45 days longer and so avoid this much bank borrowing. At the end of this fiscal year dues and initiation fees paid in advance amounted to $46,000. This practice should be discontinued, but further cash reserves are necessary before it can be done.

We have borrowed $40,000 on Certificates of Indebtedness from some of our members and these should be redeemed at a larger rate than originally contemplated, when such increase is feasible. This indebtedness should be entirely removed from our books at the very earliest possible date.

Then there has been a reduction in the number of new members this year as against last year and there is no certainty as to what the trend of membership development will be for the future or its corresponding financial effect.

The present market value of the investments representing Trust Funds under our control is, as shown by the balance sheet, approximately $40,000 less than the amount of the funds originally entrusted to us. While it is to be expected that there will be a continued increase in the value of these securities, I regard it as an obligation of the Society that it should see the principal amount of these trust funds restored at as early a date as possible.

These and other considerations point clearly to the wisdom of continuing to lay aside modest amounts from each year's income until such time as the foregoing conditions are corrected.

But on the whole the financial position of your Society is more comfortable than was the case one year ago and with the returning prosperity of our members and increasing advertising revenue from industry, there is every reason to hope that this situation will continue to improve; but I should be remiss did I fail to point out the need for constant and unremitting scrutiny of every expense as viewed in the light of the greatest membership good.

THE MEMBER'S RESPONSIBILITY

And now, as a final word, let me urge upon each of you here, the acceptance of a larger share of personal interest in and responsibility for the Society's welfare. Your presence at this Annual Business Meeting presupposes a more than usual concern in the activities of the Society and I sincerely hope that this interest will manifest itself in an even more active fashion during the year to come. We must continually be on the alert to sense what it is that the large body of our members need and want; we must satisfy that need, or make very clear the reasons for our failure to do so. You who are enthusiastic over the future before this profession and convinced of the contribution which our Society can make toward it, have a special obligation to exert a greater effort to instill some of that enthusiasm in the hearts and minds of not only your fellow members, but those in the profession who by virtue of their accomplishments should be members.

I cannot conclude this informal comment without expressing my heartfelt gratitude for the opportunities which the Presidency of this Society has afforded me. No man, however poorly qualified he is, can be insensible of the great honor of being allowed to follow in the footsteps of Thurston and Sweet and Fritz and their successors. I am profoundly grateful for your trust in placing me in the ranks of that distinguished company. As I turn over this office to my successor and friend, James H. Herron, it is with the conviction that the Society is on a straight road toward a future which is to be full of larger opportunity for service to our profession and our country.

To A.S.M.E. Members:
THE COUNCIL REPORTS *for* 1936

IN PRESENTING its report for 1935–1936, the Council places before the members a concise readable summary of the important happenings of the year, including matters of general interest contained in the reports of committees and of representatives on joint bodies. The Council expresses the hope that this shorter presentation may serve better to inform the members and arouse interest in the full reports of the Standing and Special Committees which are available to any member who will make the request. In discharging its responsibility for the conduct of the affairs of the Society the Council desires the aid of the informed opinion of all members.

Looking broadly at the results of the year's work, several grounds for satisfaction may be seen. The leadership in the Sections, Student Branches, and Professional Divisions is strong and vigorous. The publications program has made good progress. With the intensification of the technical programs initiated during the year and increased space in MECHANICAL ENGINEERING for A.S.M.E. News, the publications should render even greater service to the members. Technical work in research, standardization, and codification made substantial progress. The new Student Branch program has demonstrated its soundness for a second year. The number of members increased slightly. Less was spent than received. A modest amount was added to surplus and the bank debt was paid off. All this was accomplished despite the fact that income was only about 40 per cent of that of 1930.

Looking ahead, three phases of Society work are selected for special presentation and discussion.

One phase relates to the participation by members in the advantages of the Society, through the Sections, through meetings and publications, and through committee work. The improved industrial situation is making it possible for more members to turn their attention to their professional Society and to seek there an opportunity for self-improvement and professional fellowship. All organized groups in the Society welcome this renewed interest and desire to extend every opportunity for service. The strength of the Society has always rested in participation by many members, and its future growth and prestige will depend on the continuance of this practice. To be specific there is a real demand for more worth-while, original papers on maintenance and operating problems for presentation before Local Sections. Our research and highly technical design papers have been forthcoming in satisfactory quantity even during the depression and while these papers are of permanent value to all members, their immediate value to the great number of our members is somewhat limited. The need for papers of value to the operating man is particularly marked in process industries, machine-shop practice—in fact in all groups in the Society except power, where good papers have always been readily forthcoming. As to Committee work, particularly on technical committees there are many needs to be met. In selecting committee personnel, however, careful study should always be made of the writing or technical qualifications of prospective committee members, and the best way to be considered for technical committee work is to present evidence of ability through writing on subjects in the field covered by the committee on which service is desired.

The second phase, somewhat new, is concerned with bringing Junior members into more active contact with the Society, principally through the Local Sections. The new Student Branch plan this year brought one thousand new Junior members into the Society. These young men have had the satisfaction of participation and leadership in Student Branch work and seek the further fellowship and opportunity that the Society offers. A limited number of Juniors have been brought into contact with the Standing Committees of the Society, but the principal responsibility rests with the Sections so to organize their work that the Juniors have a greater opportunity to become acquainted with the older members and each other and to use the meetings and other activities for their professional advancement.

The third phase is one that has been given new emphasis by action of the Council looking to a more thorough scrutiny of applicants for membership and transfer in the Society. Certain logical administrative safeguards are to be instituted and steps taken to arrange personal interviews between the applicants and officially designated representatives of the Committee on Admissions. A most important step in the admissions procedure includes reports from men given as references by the applicants. It is the urgent request of the Council and the Committee on Admissions that each individual reference keep in mind that he is acting as a confidential adviser to the Committee rather than as a friendly supporter of the applicant and that the Committee must depend on his judgment and information as to the applicant's technical qualifications. The Council has enunciated the principle that safeguarding the high qualities of Members and Fellows of the Society is its most important duty and in performing it both the Council and the Committee on Admissions earnestly invoke the cooperation of all members.

The remainder of this report is a summary of various important Society interests. The first part is given over

Annual Report of the Council for 1935–1936, presented at the Annual Meeting, New York, N. Y., November 30 to December 4, 1936, THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

to two joint activities which serve the profession and provide a unified approach to problems common to the profession; such unified approach is necessary if the engineer is to be effective in his professional work and in attaining the recognition that is due him. The second part will deal with the work of the principal standing committees.

PUBLIC SERVICE

American Engineering Council is the instrument of the profession organized to render high service to the public. Because of the inherent nature of engineering and its difference from other professions, the discharge of its professional obligation to the public welfare must of necessity require an organization equipped to cooperate with government. Such an organization is the American Engineering Council—the "Engineering Embassy" in Washington. The service it renders does not ordinarily lend itself to public announcement and the members of the Council are frequently questioned as to the worthwhileness of the activity. All those who have opportunity to study its work firsthand are enthusiastic about its accomplishments.

American Engineering Council reports an increasing sense of unity and spirit of cooperation among the national, state, and local organizations of engineers, 45 of which are participating in A.E.C. During the past three years many great engineering enterprises have been carried out by the government through executive order and A.E.C. has worked with those in administrative authority to expedite matters in the public interest in which engineers played a part. While this procedure is less spectacular than the former procedure of cooperation with legislative groups, it is none the less a sound contribution to the public service. A.E.C. has rendered valuable aid to employment of engineers by cooperation with the Engineering Societies' Employment Service in meeting demands for technically qualified engineers for a wide variety of public undertakings. Throughout its work of serving the government service, A.E.C. has striven to develop sympathetic understanding of the value and services of the engineer. It has upheld Civil Service standards. It has worked to gain the protection of engineers in private practice.

At the suggestion of A.E.C., the Bureau of Labor Statistics has entered into a study of the engineering profession. The first report, summarized in MECHANICAL ENGINEERING for July, 1936, deals with Educational Qualifications in the Engineering Profession. The full report when completed will provide a basic document on such questions as compensation, professional training, and the distribution of engineers in industry.

ENHANCING THE ENGINEER'S STATUS

The year closed is the fourth year of the Engineers' Council for Professional Development. The function of this joint body has been defined as the enhancement of the status of the engineer. The great interest aroused in its program promises success. Every member of the A.S.M.E. should understand, however, that E.C.P.D., except in a single instance, is not an administrative agency. It recommends procedures only after painstaking study and these then to be effective must be carried out by other bodies and by individual members of the profession. Briefly stated, the immediate objective is the development of a system whereby the progress of the young engineer toward professional standing can be recognized by the public, by the profession, and by the man himself through the development of technical and other qualifications which will enable him to meet minimum provisions. The program to attain this objective includes:

1 Educational and vocational orientation of young men who are planning to enter engineering schools.

2 Cooperation between the engineering profession and the engineering schools.

3 Further professional and personal development of young engineering graduates.

4 Establishment of suitable standards for professional recognition.

To individual members and to Local Sections, two phases of this program present a direct challenge: The guidance of young men about to enter engineering, and the encouragement of the young graduate to a program of self-study and development. In a number of cities, groups of older engineers have been organized to carry on these important activities but much more remains to be done.

In the field of cooperation between the profession and the schools, definite progress has been made in the immediate task, that of providing a list of accredited schools, and only recently the accredited curricula in the schools in two northeastern regions were announced.

THE WORK OF THE SOCIETY

The Council.

The Council has taken an important step by placing full responsibility for leadership upon the senior member of the Council for each of the seven geographical areas in which the Local Sections are grouped. Each Senior Councilor thus designated has aided materially in the work of the Society by conference with the Local Section officers, by correspondence and contact with the members, and by the presentation of members' views to the Council.

Publications.

Questions of publication policy and continued study of the publications themselves with a view to providing the maximum of service to members with the minimum of expense have engaged the attention of the Committee on Publications throughout the year. On matters of policy the Committee was greatly assisted by joint discussions with the Advisory Board on Technology. The Committee has adhered to the principle of recommending no changes except those arrived at after full study and wide discussion.

The vital interests and the basic needs of the Society membership have indicated the primary objectives and posed the most difficult problems. How best to pro-

vide for the obvious needs and interests of the diversified membership presents a complex question. But the real problem is how to appraise wisely and to satisfy adequately the relative claims of diverse groups under the limitations of drastic financial restriction.

The expressed desires of the membership for more news of Society activities have been recognized by an expansion of the news section of MECHANICAL ENGINEERING and by definite planning for further development as circumstances permit.

As a result of the cooperation of the Divisions and Committees, and because of a reduced number of meetings, all general meeting papers received in time for editing are this year, being preprinted in MECHANICAL ENGINEERING or in Transactions, the discussions and closure appearing in subsequent issues. Plans now under consideration indicate the possibility of further improvement in this vital service to members, but an expected increase in meeting and Society activities will throw an additional burden on the editorial staff and its publication budget for which adequate resources in personnel and funds are urgently needed.

The Committee on Publications is grateful to friends of deceased members who have cooperated in increasing the accuracy of the memorial notices, published as a part of the Society Records. The innovation of soliciting signed obituaries from former associates of deceased members has been successfully launched and will be expanded. During the coming year the *Student Branch Bulletin* will be incorporated with MECHANICAL ENGINEERING. This will simplify operating procedure, inform the membership at large of the activities of the Student Branches, and enhance the interest of the student members in MECHANICAL ENGINEERING. The Membership List will be published in February, 1937. The *Journal of Applied Mechanics* is to be continued as a regular quarterly issue in the series of Society Transactions on the same proportionate basis as heretofore.

Meetings.

Three national meetings were held, the Annual at New York, the Semi-Annual at Dallas, and one at Niagara Falls. The Annual Meeting was, as usual, successful in attendance, technical quality, and social interest. At Dallas, in addition to the fine program, the Calvin W. Rice Lecture by Dr. Hilding Törnebohm of Sweden proved a notable event. The Niagara Falls program was arranged in conjunction with the World Power Conference and proved to be very attractive to foreign delegates attending the conference.

Local Sections.

The Sections show substantial improvement over the previous year due to improved economic conditions, to the work of the Group Conferences and the Group Delegates Conference, and to the visits of Council members, Local Section committee members, and staff. Five hundred and ninety-six Section meetings were held during the year. Junior activity has been organized in some form in 29 Sections. The ten regional student meetings were well supported by the Sections.

Professional Divisions.

Encouraging progress has been made in accomplishing five objectives: (1) Carrying out the plan for grouping the Divisions in departments, five in number—basic science, management, power, manufacturing, transportation; (2) securing greater cooperation between Divisions in the planning of joint sessions for Annual and Semi-Annual Meetings; (3) improving quality of technical sessions at these meetings; (4) making individual committee members responsible for stimulation of departments; (5) improving relations with other standing committees.

Library.

This has been the second busiest year in the history of the Engineering Societies Library, approximately 44,000 persons having used it. Over twenty per cent of this number made use of the lending, bibliographic, copying, and translating services, without visiting the Library in person.

Three thousand books and maps were added to the collection, now numbering 150,000 in all.

Admissions.

The work of the Committee on Admissions resulted in the recommendation of net increases and transfers of 1223. After discussion with the Council, the Committee on Admissions has moved slowly in its recommendations of candidates for the new grade of Fellow, as it is desired to have a clear understanding of the prerequisites for this new grade, and at the time of writing this report, no elections to this grade have been announced.

CHANGES IN MEMBERSHIP

October 1, 1935, to September 30, 1936

	Membership		
	Sept. 30, 1936	Sept. 30, 1935	Net changes
Honorary	17	16	+ 1
Life	67	67	0
Member	8887	6375	+2512
Associate	265	268	— 3
Associate Member	15	2604	—2589
Junior (10)	3487	3239	+ 248
Junior (20)	1617	1448	+ 169
	14,355	14,017	+ 338

Constitution and By-Laws.

The Committee on Constitution and By-Laws has devoted practically all of its time during the past year to a comprehensive and thorough revision of the Constitution, By-Laws, and Rules with the view of securing a more logical order of paragraphs, and also of clarifying and bringing the regulations into closer conformity with present needs.

Student Branches.

The past year was the second complete year of the new Student Branch policy, and from every indication the plan has proved itself to be a real step forward in the operation of Student Branches; 3793 students, the largest number affiliated in any one year, paid dues as student members. Of the 1633 student members graduated with the class of 1935, 725 completed their transfer to Junior member-

ship by the payment of their first year's dues. In 115 colleges a total of 479 meetings were reported.

The ten regional Student Group Meetings were interesting and stimulating. Approximately 1700 students participated.

Three new Student Branches were authorized, Duke University at Durham, N. C., the University of New Mexico at Albuquerque, N. M., and South Dakota State College at Brookings, S. D.

Six loans to student members amounting to $875 were authorized from the Max Toltz Fund.

Awards.

A.S.M.E. Medal to Charles T. Main.
Worcester Reed Warner Medal to Stephen Timoshenko.
Melville Award to Oscar R. Wikander.
Junior Award to Stanley J. Mikina.
Charles T. Main Award to G. Lowell Williams.
Student Award, undergraduate, to Robert W. Beal.
Student Award, postgraduate, to Charles P. Bacha.

Research.

The past twelve months have been devoted by the majority of the Society's special research committees principally to the laying of plans and the accumulation of funds in preparation for active work during the coming year. As in the past many of these committees have sponsored technical sessions or contributed papers to sessions sponsored by the professional divisions.

The four most notable events were:

1 The reorganization of the Lubrication Committee.

2 The completion of the report of the Joint A.G.A.-A.S.M.E. Committee on Orifice Coefficients.

3 The publication of the report on the useful life of wire rope.

4 The successful experiments in the use of nickel cast iron for the worms of worm gears.

Safety.

The Standing Committee on Safety has kept this subject before the membership through an annual meeting session and by the stimulation of the several safety-code committees. The subject of the session was Occupational Diseases and the codes which were advanced a considerable distance toward completion are the Safety Code for Elevators and the Safety Code for Compressed-Air Machinery.

In addition the members of the standing committee individually took active part in the annual meeting of the National Safety Council held at Atlantic City.

Standardization.

The Standardization group of technical committees has had an active year. The following six standards were passed through the final stages of the required procedure and were submitted to the American Standards Association: Brass Fittings for Flared Copper Tubes; Socket Setscrews and Socket-Head Cap Screws; Pipe Plugs; Circular and Dovetail Forming-Tool Blanks; Chucks and Chuck Jaws; Lathe Spindle Noses.

Twenty other standards projects were advanced one or two steps in that procedure.

Probably the most significant accomplishment during the year was the completion and approval of the last two standards named. This represents the conclusion of several years' work and is a distinct advance, even though these standards have been limited in the final approvals to use on turret and automatic lathes.

Power Test Codes.

Routine development work characterized the activity of the group of twenty-two power test code committees during the year. Three of the technical committees No. 2 on Definitions and Values, No. 8 on Centrifugal and Rotary Pumps, and No. 9 on Displacement Compressors and Blowers were reorganized and began the revision of their codes. Four new sections of Instruments and Apparatus were published.

Boiler Code.

New rules have been adopted for containers for gases and liquids at subzero temperatures. Working stresses for certain nonferrous materials were adopted. Study was given to revised requirements for fusible plugs in cooperation with the Bureau of Navigation and Steamboat Inspection. Progress is being made in the revision of Section VIII of the Code with a view to coordinating the A.S.M.E. and A.P.I.-A.S.M.E. Codes for Unfired Pressure Vessels. Revisions have been adopted in the various sections of the Code and new A.S.T.M. specifications have been incorporated.

Finance.

The report of the Finance Committee follows this report of the Council and merits careful study.

Professional Status and Registration.

The Special Committee on Registration, organized with seven members, has devoted itself to a consideration of modifications in the model licensing law to meet the needs of mechanical engineers.

Parker Case.

At the close of the fiscal year, President Batt addressed a letter to the members conveying the decision of the court in the Parker case. The Court found "that none of the property or funds of the corporation have been misappropriated or diverted to any other purpose than that for which the corporation was incorporated."

Dr. Fred R. Low.

In the death in January of former President Fred R. Low the Society sustained a great loss. Though incapacitated for active service during recent years, Dr. Low's leadership and influence were far-reaching, particularly in the Boiler Code and Power Test Codes Committee.

CONCLUSION

To the member who has read this report, the conclusion must appear clear that the Society has completed a successful year. Substantial progress has been made throughout the broad scope of the activities of the Society. It is also apparent that much remains to be done to advance the interests of the individuals who make up the Society. To this task, the Council invites the cooperation and support of every member.

A.S.M.E. FINANCE REPORT, 1935–36

THE A.S.M.E. has this year transferred net operating income to surplus in the amount of $20,941.62. This is four times the amount so transferred last year, and nearly twice the amount budgeted for this year. In addition, initiation fees of $8,961.44 were directly credited to surplus, making the year's total credit to Surplus on these accounts $29,903.06.

Surplus also gained $12,256.64 through net additions to dues receivable, as forecast in the auditors' certificate dated November 30, 1935, and appended to last Year's Finance Committee report.

More than offsetting these and minor items, reported Surplus was reduced in the amount of $137,432.03 as the result of setting up investments on the balance sheet at present market value in place of cost as for several years heretofore. It was considered unwise longer to continue carrying these investments at cost. The result is that the reported surplus is at the lowest level in many years. It had been hoped that with this adjustment the balance sheet would have reached the rock bottom of conservatism. There remains, however, a necessary adjustment in the account, inventory of publications for sale, the amount of which cannot at the moment be determined.

Trust-fund assets have similarly been revalued at market instead of cost basis, resulting in a deduction the effect of which appears on both sides of the balance sheet.

This year has been completed without borrowing from the bank. Money accumulated in custodian funds was used as heretofore, however, to supplement other cash resources during the latter part of the fiscal year. While interest is paid on money so borrowed, such borrowing is not conservative.

The Society's only debt now (other than current liabilities and deferred credits) is that which is owed on account of certificates of indebtedness. This debt is being regularly reduced in accordance with the agreement under which certificates were issued.

BUDGET

Operating income exceeded that finally budgeted by $16,008.65. Expenses exceeded budgetary allowance by $6,864.03. Increased expenditure was incurred chiefly in order to derive increased income; as, for example, in connection with advertising income, more money was spent for printing and commission in order to realize increased advertising revenue.

INVESTMENTS AND TRUST-FUND ASSETS

These have had constant attention. Certain securities have been sold where such action seemed opportune, the net result having been a small loss from recorded (cost) value, in the cases of securities owned. No new investments have been made, but funds realized from the sale of trust-fund assets have been deposited in savings banks.

Mortgage certificates of Lawyers Mortgage Company remain the chief items of portfolio. The cost of these certificates as shown last year was $299,500. The then appraised market value was $142,777.50, and the income received during 1934–35 was $13,179.81. During the current year, $857.15 have been redeemed, leaving a cost value remaining of $298,642.85. The present appraised market value is $167,381.96 and the income received during the year was $12,585.07.

A large proportion of the mortgages underlying these certificates have been "reorganized" at reduced rates of interest. Other reorganizations and a few foreclosures are pending. Average percentage yields on real-estate mortgage bonds and certificates were:

	Trust-fund assets	Society investments	Aggregate
1933–34 based on cost	4.46	3.37	3.64
1934–35 based on cost	4.13	3.59	3.75
1935–36 based on cost	4.20	3.40	3.60
1935–36 based on market	8.11	6.73	7.09

COMMENT ON DETAILED STATEMENTS

Exhibit A, Balance Sheet

Accounts receivable, dues, $19,827.12. The books show approximately $38,000 of dues receivable which are not more than one year in arrears.

Accounts receivable, publications and advertising, $41,299.68. The publications portion, not audited by the accountants, amounts to $6,078.27, less a small share of the reserve.

Inventories are valued at cost.

Trust-fund assets, notes receivable—Major Max Toltz Fund, $5,668.52. These represent loans to students. Such loans are frequently (perhaps necessarily) slow. Notes outstanding in a few instances date back to 1927. The collection of these notes, and the form and conditions of loans, are having renewed attention.

Reserve for employees' retirement allowances, $11,166.61. This amount is recognized as far short of requirements under any reasonable actuarial computation.

Exhibit B, Summary of Income and Expenses

Membership dues, $198,209.83. This is the cash income received. The provision for uncollectible dues, $21,000, represents the difference between current billings and cash receipts.

WALTER RAUTENSTRAUCH, *Chairman* J. J. SWAN
WM. T. CONLON, *Vice-Chairman* *Council Representatives:*
K. W. JAPPE W. A. SHOUDY,
K. N. IRWIN J. A. HALL[1]
W. D. ENNIS, *Treasurer*

[1] Deceased November 16, 1936.

ACCOUNTANTS' CERTIFICATE

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS:

We have made an examination of the balance sheet of The American Society of Mechanical Engineers as of September 30, 1936, and of the summary of income and expenses and statement of surplus for the year ended that date. In connection therewith, we made a review of the accounting methods and examined or tested accounting records of the Society and other supporting evidence in a manner and to the extent which we considered appropriate in view of the Society's system of internal accounting control.

Under the terms of our engagement, the accounts receivable, other than advertising accounts, at September 30, 1936, and collections during the year were not verified by confirmations obtained from the debtors. In substantiation of inventory quantities we have accepted certificates from officials of the Society.

In accordance with the practice followed by the Society there have not been included in its accounts nor in the accompanying statements any accruals of interest receivable.

In our opinion, subject to the foregoing, the accompanying balance sheet and related summary of income and expenses and statement of surplus, with the footnotes thereon, fairly present, in accordance with accepted principles of accounting consistently followed by the Society, its financial condition as of September 30, 1936, and the results of operations for the year ended that date.

New York,
November 13, 1936.

(Signed) HASKINS & SELLS.

EXHIBIT A—BALANCE SHEET, SEPTEMBER 30, 1936

ASSETS

CURRENT ASSETS:		
Cash		$ 44,019.45
Accounts receivable:		
Dues (less reserves for uncollectible items, $36,862.04)	$19,827.12	
Publications and advertising (less reserve for uncollectible items, $5,142.19)	41,299.68	
Miscellaneous	1,824.34	62,951.14
Inventories:		
Publications for sale	$36,557.61	
Publications in process	9,258.13	
Supplies	3,370.57	49,186.31
Securities—At market quotation value		14,944.25
TOTAL CURRENT ASSETS		$171,101.15
REAL-ESTATE MORTGAGE BONDS AND CERTIFICATES—AT MARKET QUOTATION VALUE:		
Pledged as collateral to Certificates of Indebtedness	$ 42,075.00	
Unpledged	90,733.21	
TOTAL REAL-ESTATE MORTGAGE BONDS AND CERTIFICATES		132,808.21
TRUST-FUND ASSETS:		
Corporate stocks and real-estate mortgage certificates—at market quotation value	$ 69,260.75	
Notes receivable—Major Max Toltz Fund	5,668.52	
Cash	9,537.08	
TOTAL TRUST-FUND ASSETS		84,466.35
PROPERTY-FUND INVESTMENTS:		
One-fourth interest in real estate and other assets of United Engineering Trustees, Inc., exclusive of trust funds	$496,948.48	
Office furniture and fixtures (depreciated value)	23,762.62	
Library books	1.00	
Engineering Index—Title and goodwill	1.00	
TOTAL PROPERTY-FUND INVESTMENTS		520,713.10
TOTAL		$909,088.81

LIABILITIES

CURRENT LIABILITIES:		
Accounts payable	$10,681.49	
Unfilled commitments—Estimated liabilities relating to Mechanical Catalog for 1936–1937	14,546.91	
Custodian funds	32,826.68	
Accrued interest on certificates of indebtedness	400.50	
TOTAL CURRENT LIABILITIES (exclusive of certificates of indebtedness to be redeemed January 1, 1937)		$ 58,455.58
FOUR PER CENT CERTIFICATES OF INDEBTEDNESS, due January 1, 1937, to January 1, 1944 (10% of the total amount issued to be redeemed January 1, 1937) See investments pledged contra:		
Authorized, $125,000.00		
Issued	$45,650.00	
Less redeemed on January 1, 1936	5,000.00	
Outstanding	$40,650.00	
Less in treasury	600.00	40,050.00
TRUST-FUND RESERVES:		
Principal	$73,181.69	
Income	11,284.66	84,466.35
PROPERTY-FUND RESERVE		520,713.10
RESERVE FOR EMPLOYEES' RETIREMENT ALLOWANCES		11,166.61
DEFERRED CREDITS:		
Dues and initiation fees paid in advance	$45,864.61	
Prepaid subscriptions	4,000.00	
Prepaid advertising	486.60	
TOTAL DEFERRED CREDITS		50,351.21
SURPLUS, PER EXHIBIT C		143,885.96
TOTAL		$909,088.81

NOTE: In accordance with the Society's practice, initiation and promotion fees receivable are not included in the above statement as they are taken up by the Society as assets only as and when collected.

EXHIBIT B

COMPARATIVE SUMMARY OF INCOME AND EXPENSES

For Two Fiscal Years Ended September 30, 1936

	1935–36	1934–35
INCOME:		
Initiation and promotion fees (to surplus)	$ 8,961.44	$ 15,800.23
Membership dues (less provision for dues considered uncollectible at September 30, 1936, $21,000; September 30, 1935, $10,000)	198,209.83	201,660.34
Student dues	11,411.50	9,738.50
Interest and discount	10,451.11	11,871.06
MECHANICAL ENGINEERING advertising	63,716.04	53,503.64
Mechanical Catalog advertising	47,547.59	42,258.15
Publications sold	53,980.60	47,712.06
Miscellaneous sales	1,808.00	1,440.25
Contributions, *Journal of Applied Mechanics*	1,490.00	1,531.00
Contributions, unrestricted	373.98	23.00
Contributions, technical committees	.....	400.00
Registration fees	245.00	.....
Profit (*loss*) on sale of securities	*120.00*	65.79
Sale of equipment	117.00	1,293.00
TOTAL INCOME	$389,230.65	$371,496.79
EXPENSE:		
Expenses under committee supervision	$ 74,618.86	$ 70,520.86
Publication expense (including provision for uncollectible accounts receivable other than dues, less recoveries; 1935–36, $2,238.05; 1934–35, $3,466.97)	108,571.91	107,002.60
Office expense	185,098.26	188,848.57
TOTAL EXPENSE	$368,289.03	$366,372.03
Net addition to Surplus	$ 20,941.62	$ 5,124.76

EXHIBIT C

STATEMENT OF SURPLUS

For Fiscal Year Ended September 30, 1936

BALANCE, October 1, 1935			$238,849.45
CREDITS:			
Initiation and promotion fees		$ 8,961.44[a]	
Adjustment of life-membership fund reserve—Net		164.90	
Adjustment of prior year's inventory		504.64	
Adjustment of dues receivable controlling account to amount shown by detail records, as of October 1, 1935	$20,669.90		
Less special reserve provided thereagainst	8,413.26	12,256.64	
Net income for the year (from Exhibit B)		20,941.62	42,829.24
TOTAL			$281,678.69
CHARGES:			
Write-off of Sweet Biography inventory value		$ 369.70	
Write-down of investments owned at September 30, 1936, to market quotation values at that date (exclusive of net write-down of $42,736.41, with respect to trust-fund investments, charged against trust-fund reserves)		137,423.03	137,792.73
BALANCE, SEPTEMBER 30, 1936			$143,885.96

[a] NOTE: It being the practice of the Society to take up initiation and promotion fees only as and when collected, the above statement does not include such fees receivable at September 30, 1936, and October 1, 1935.

DETAILED COST OF A.S.M.E. ACTIVITIES

	Expense under committee supervision	Printing and distribution expense	Office expense	Total cost 1935–36	Total cost 1934–35
Council	$ 5,678.28			$ 5,678.28	$ 2,560.98
Library	8,497.08			8,497.08	8,509.53
American Engineering Council	10,000.00			10,000.00	8,778.00
Engineers' Council for Professional Development	450.00			450.00	
Awards	793.95			793.95	364.38
Nominating Committee	662.24			662.24	416.06
Constitution and By-Laws	107.83			107.83	
Local Sections	19,137.20		$ 10,195.96	29,333.16	26,806.31
Meetings and Program	4,681.46		4,248.31	8,929.77	9,217.94
Professional Divisions	2,080.42		4,248.31	6,328.73	7,176.56
Admissions			6,793.08	6,793.08	7,027.00
Employment service	6,670.89		2,031.95	8,702.84	10,343.65
Student Branches	7,672.78	$ 3,211.51	7,480.14	18,364.43	16,464.53
Technical Committees	714.49		16,810.10	17,524.59	17,390.01
MECHANICAL ENGINEERING Text Pages		22,684.65	9,938.40	32,623.05	32,463.33
Transactions		20,109.80	10,689.18	30,798.98	31,855.95
Journal of Applied Mechanics	251.42	6,122.05		6,373.47	4,215.18
Membership List					5,308.15
MECHANICAL ENGINEERING Advertising Pages		15,160.07	19,465.36	34,625.43	35,049.08
Mechanical Catalog		17,302.45	15,181.59	32,484.04	30,512.33
Publications for Sale		23,981.38	8,821.57	32,802.95	28,747.31
Parker Case	1,908.25			1,908.25	2,326.37
Interest (Certificates of Indebtedness and Bank Loan)	2,073.99			2,073.99	4,312.36
Professional Services	3,238.58			3,238.58	1,855.00
Secretary's Office			15,732.16	15,732.16	17,897.06
Accounting			13,674.61	13,674.61	11,216.53
General Service			26,281.94	26,281.94	32,261.57
General Office Expense			13,505.60	13,505.60	11,242.20
Membership Census					2,054.66
TOTALS	$74,618.86	$108,571.91	$185,098.26	$368,289.03	$366,372.03

A.S.M.E. IN CONVENTION

A Resume of Technical, Social, and Business Events at 1936 Annual Meeting of The American Society of Mechanical Engineers

WITH A registration in excess of 2300 from 36 states and 9 foreign countries, the Fifty-Seventh Annual Meeting of The American Society of Mechanical Engineers engaged the attention of members and guests for a full week, beginning on Sunday, November 29, and running through Friday night, December 4. On Saturday many who were also members of the Society for the Promotion of Engineering Education took the opportunity to stay over to participate in the fall meeting of the Middle Atlantic Section of that Society, a brief report of which will be found on page 61 of this issue. Coincidently with the A.S.M.E. meeting the Exposition of Power and Mechanical Engineering was held at the Grand Central Palace with many of the Society's members in attendance as exhibitors and visitors. Into the same crowded week were introduced this year the luncheon in honor of Rudolph Diesel, honorary member, A.S.M.E. (see page 60) and the meetings of other engineering groups with which members of the A.S.M.E. are identified; e.g., the Aviation Meeting, under the joint auspices of the A.S.M.E., the S.A.E., and the Institute of Aeronautical Sciences, the Personnel Research Federation, and the Society of Management, and the American Society of Refrigerating Engineers. A report of the Aviation Meeting will be found on page 35.

With so full and varied a program, which included technical meetings, society affairs, and social events, a complete account of all features cannot be attempted. Hence only the highlights will be mentioned, in the hope that those who were unable to be present may obtain a slight impression, at least, of the intense activity that marked that busy week.

For reasons that will appear obvious, reports of the meetings of the A.S.M.E. Council and the Swasey dinner have been separated from this summary and will be found elsewhere in this issue. Mr. Batt's presidential address, which dealt with his views on Society problems, and the reports of the Council and the Finance Committee also appear separately. More detailed accounts of certain sessions will be published in later issues.

COMMITTEES IN CHARGE OF THE MEETING

The conduct of an A.S.M.E. Meeting is under the jurisdiction of the Committee on Meetings and Program. The chairman of the committee which handled the 1936 meeting was Ely C. Hutchinson. Gen. Robert I. Rees, chairman of last year's committee, had met with this year's committee and rendered valued service to it up to the time of his sudden death, on November 23, in Detroit. Other members of the committee were Harvey N. Davis, Clarke Freeman, R. F. Gagg, and C. G. Stoll.

Cooperating with the Committee on Meetings and Program was the Committee on Professional Divisions, of which K. H. Condit was chairman, and G. B. Pegram, Crosby Field, L. K. Sillcox, and H. B. Reynolds, members. To this committee great credit is due on account of the efforts that were exerted to coordinate the details and procedure relating to the technical sessions and papers. Earnest attempts were made this year to reduce the number of simultaneous technical sessions and the number of papers presented for discussion at each session. A plan was worked out and put to trial which divided all papers into three general categories: (1) Technical papers presented for discussion (most of these were published in the Transactions or MECHANICAL ENGINEERING prior to the meeting); (2) technical papers of a nature not suitable for extensive oral discussion, presented by title and assigned for publication in Transactions at a later date; (3) formal discussions of general subjects in special fields for which no prepublication had been arranged, but which are to be reported in MECHANICAL ENGINEERING this month or later. In general the plan worked admirably, although there was evident a need for more time for some of the panel discussions and a greater amount of familiarity on the part of all concerned, including the audience, as to what is aimed at and how it can be accomplished.

The committee on arrangements for Honors Night had as its general chairman Roy V. Wright, past-president of the Society. J. B. Wright headed the Westinghouse committee. Herman Diederichs, unable to be present, represented the Board on Honors and Awards; and O. B. Schier, 2d, who was in charge of the ushers, and K. H. Condit also served on the Honors Night Committee.

For the dinner, which was an unusually successful feature of the meeting, the responsibility rested with a committee consisting of the following: Lillian M. Gilbreth, Elliott H. Whitlock, David C. Cory, W. T. Conlon, N. H. Memory, C. W. Parsons, J. I. Yellott, George Kelsey, Charles Hescheles, F. A. Scheffler, and Samuel H. Libby.

A committee was also organized by the Women's Auxiliary to plan and administer the details of a program for the women. Mrs. W. H. Boehm, president of the Women's Auxiliary headed this group, on which also served Mrs. J. N. Landis, chairman, Mrs. F. M. Gibson and Mrs. W. S. Huson, in charge of registration, Mrs. A. H. Morgan, excursions, Mrs. Leo Geenens, luncheon, Mrs. A. L. Kingsbury, annual dinner, Mrs. Roy V. Wright, annual tea, and Miss Burtie Haar, publicity.

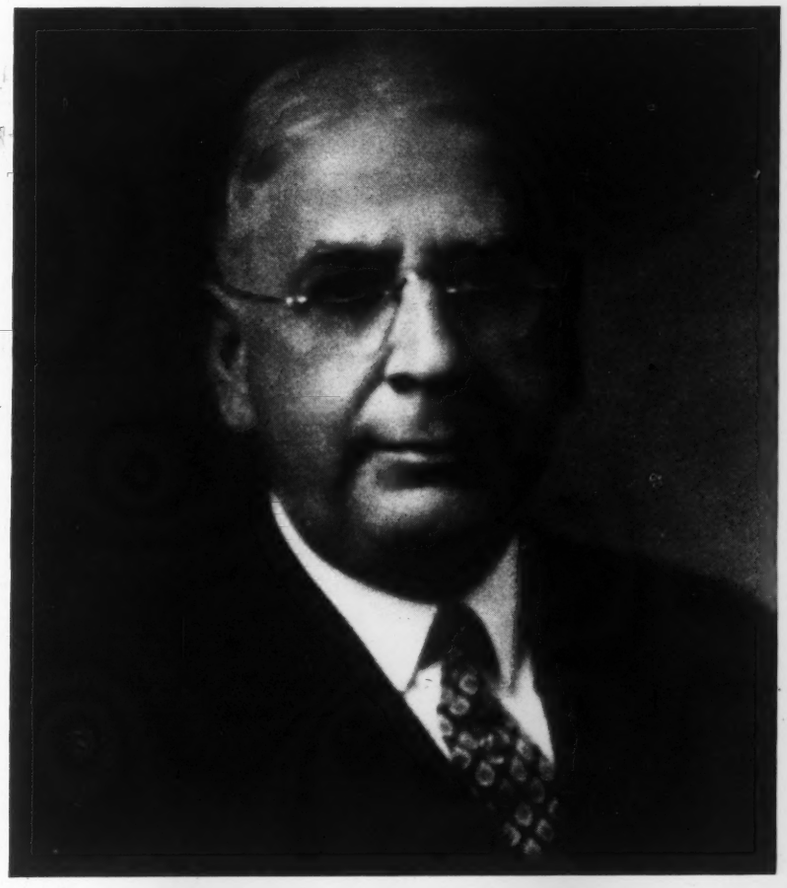
GROUP DELEGATES CONFERENCE

Representatives to the Group Delegates Conference began arriving on Saturday, November 29, and undertook their formal deliberations on the following day.

Heading this conference was Walter L. Edel, dean of engineering at the Connecticut State Agricultural College, who had been elected chairman at last year's meeting. The secretary was S. R. Beitler, of The Ohio State University.

The Group Delegates Conference is composed of two official delegates from each of the seven local-section group conferences that are held in October and November in the seven geographical divisions into which the local sections are divided for purposes of administration. At the group conferences each section is entitled to a representative. Society affairs are considered at these conferences, matters to be brought before the Group Delegates Conference in New York are discussed, and a delegate, to serve for two years as a representative of the group, is elected. At the New York conference, therefore, are 14 representatives, seven of whom were in attendance last year and seven of whom will be present next year.

The Group Delegates to the 1936 Annual Meeting were as follows:



JAMES H. HERRON

PRESIDENT, A.S.M.E., 1937

GROUP I: 2 yr, A. L. Davis, Waterbury, Conn., Waterbury Section; 1 yr, W. L. Edel, Storrs, Conn., Norwich Section.

GROUP II: 2 yr, V. M. Frost, Newark, N. J., Metropolitan Section; 1 yr, Theo. Baumeister, Jr., New York, N. Y., Metropolitan Section.

GROUP III: 2 yr, J. P. Harbeson, Jr., Camden, N. J., Philadelphia Section; 1 yr, R. S. Brescka, Cranford, N. J., Plainfield Section.

GROUP IV: 2 yr, Dean L. J. Lassalle, Baton Rouge, La., New Orleans Section; 1 yr, Dean S. B. Earle, Clemson College, S. C., Greenville Section.

GROUP V: 2 yr, K. F. Treschow, Pittsburgh, Pa., Pittsburgh Section; 1 yr, S. R. Beitler, Columbus, Ohio, Columbus Section.

GROUP VI: 2 yr, C. A. Koepke, Minneapolis, Minn., Minnesota Section; 1 yr, R. M. Barnes, Iowa City, Iowa, Tri-Cities Section.

GROUP VII: 2 yr, E. O. Eastwood, Seattle, Wash., Western Wash. Section; 1 yr, D. R. Gray, Spokane, Wash., Inland Empire Section.

On Sunday afternoon the delegates, members of the Council, and chairmen of standing committees were guests of Secretary and Mrs. C. E. Davies at an informal tea held in the rooms of the Engineering Woman's Club. Following the tea President Batt addressed the delegates, Council members, and chairmen at the Engineers' Club, and encouraged a frank and informal discussion of Society problems.

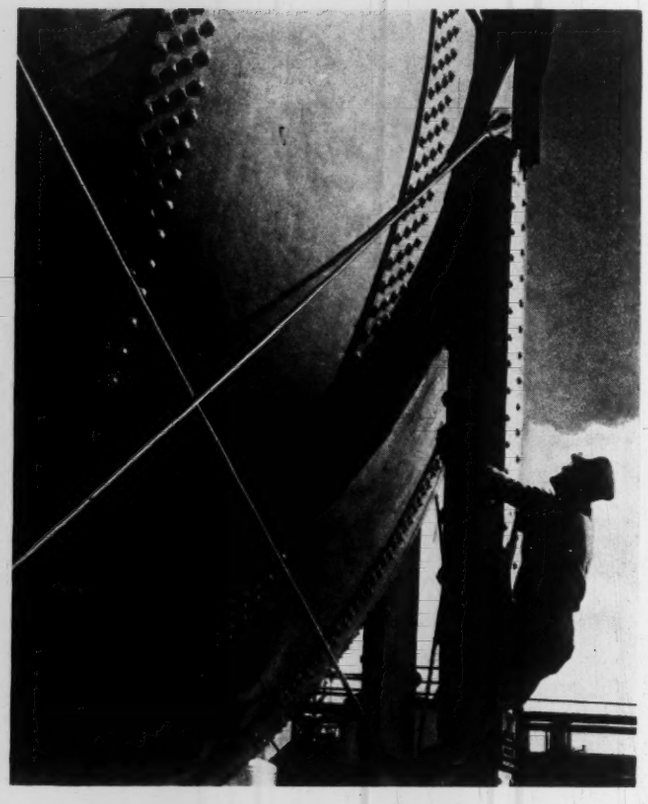
Monday morning and afternoon were given over to a meeting of the Council, which is reported in the A.S.M.E. News section of this issue, the annual business meeting of the Society, and sessions of the Group Delegates Conference. At the business meeting President Batt delivered an address on the Society's problems, which appears as the leading article in this issue. A brief report on the business meeting will be found on page 18 of this issue.

Through the courtesy of W. L. Edel, chairman of the Group Delegates Conference, the following résumé of the deliberations of the Group Delegates Conference has been prepared.

There were many items on the agenda originating in Council and other organization agencies of the Society as well as questions proposed by the membership at large and in the Local Sections. These matters were divided and assigned for consideration to four subcommittees which reported to the delegates group as a whole. The opinions and actions of this group in connection with these matters will be written up in the minutes of the Conference and presented to the Council and other interested bodies of the Society as well as distributed to delegates and to the local sections.

The Delegates Conference continued its deliberations Monday morning and at noon met with the Council and the Committee on Local Sections at luncheon at the Hotel Astor.

At the business meeting on Monday afternoon the delegates group presented through the Committee on Local Sections the



"INSPECTION"—PHOTOGRAPH BY J. A. LUCAS SHOWN AT PHOTOGRAPHY EXHIBITION AT ANNUAL MEETING

names of those suggested at the regional group conferences as members of the Nominating Committee for 1937. The delegates fostered successfully two important recommendations of amendments to the Constitution. The first one concerned transfer fees and dues of junior-grade members after reaching the age of thirty; the second pertained to the status of local sections and Local Sections Delegates Conferences. This in effect supports the present arrangement of delegates meetings. These two matters will be submitted to the membership for vote.

After the business meeting the delegates attended a Council meeting where an opportunity was afforded to present to Council any matters of importance from the group.

The delegates concluded their work at the Annual Meeting with a session lasting all Tuesday morning, at the conclusion of which officers for the ensuing year were appointed.

During the course of these meetings joint discussions were held with the Council, Committee on Local Sections, members of the Professional Divisions Committee, special delegates from the Los Angeles and Detroit Sections, as well as officers in general of the Society.

The Conference elected as its officers for the coming year, chairman, J. B. Harbeson, Jr., of the Philadelphia section, and secretary, Vincent M. Frost, of Newark.

Although the meetings of the Group Delegates Conference kept its participants actively engaged for many hours opportunity was afforded for attendance at some of the technical seesions and for joining with other members of the Society in the major social events of the meeting.

COUNCIL MEETINGS

While matters of general interest to members discussed and acted upon by the Council are reported on pp. 51 to 55 of this issue it should be stated here that they attracted a full attendance. President Batt used a handsome gavel with a head of onyx which was presented to him by the Los Angeles Section.

The 1937 Council convened on Friday morning immediately following the completion of the business of the 1936 Council. President Batt thanked all the members of the Council for their cooperation and introduced James H. Herron, president, the new members of council, and the new chairmen of committees present at the meeting.

A vacancy in the 1937 Council caused by the death of James A. Hall, of Providence, was filled by the unanimous election of Harry R. Westcott, of New Haven.

At the Monday session the following resolution on the death of Professor Hall was read:

James Alexander Hall

During his twenty-four years of membership in the Society, James A. Hall served it in many important capacities. Among them are: Chairman of the Providence Section in 1921 and 1922, member of the Standing Committee on Local Sections from 1922 to 1926 and its chairman in 1926; member of the Special Research Committee on Cutting Metals, 1924 to 1931; chairman of the 1929 Nominating Committee; member of Constitution and By-Laws Committee, 1931–1934; member of the Council from 1933 to 1936; member of the Executive Committee of the Council from 1934 to 1936.

About a month before his death on October 29, 1936, his fellow members in the Society had elected him a vice-president to take office on December 4, 1936.

He rendered distinguished service to this Society by his eminent example as a member and by his inspiring leadership as an officer, and by the infectious enthusiasm and realistic approach to all the problems he undertook to solve.

No words of appreciation can express the gratitude which this Society feels for him.

As a notable educator and engineer, as a wise counselor and a loyal and beloved friend, he is respected and revered for his great and genuine sincerity.

That in this Society there may be a memorial, this minute is inscribed on the records to commemorate the esteem of his associates for "Jim" Hall.

ANNUAL BUSINESS MEETING

The Annual Business Meeting of The American Society of Mechanical Engineers was held in the auditorium of the Engineering Societies Building, New York City, on Monday afternoon, November 30, President Batt presiding.

Reports of the Council and of the administrative and other committees were presented and approved. These reports had been available in photo-offset form and had been discussed at the seven Group Conferences of Local Sections' Delegates, held during October and November. A summary of these and the report of the Finance Committee are published in this issue, pp. 9–15.

There was also presented the certification of the president and treasurer of the property owned and the property-fund items, which showed that there is in the hands of the Society $53,556 deposited in fourteen savings banks and in the treasurer's and cashier's banks.

A list of members and their addresses who were elected during the year ending September 30, 1936, was presented and placed in the record of the minutes of the meeting.

President Batt chose the 1936 Annual Business Meeting as the occasion on which he wished to deliver his address, since it dealt with a study of A.S.M.E. affairs. This address is published elsewhere in this issue.

The nominations for members of the Nominating Committee were read and the nominees elected. The personnel of the committee is as follows:

Group I: Charles M. Allen, Worcester, Mass.; T. H. Beard, Bridgeport, Conn., first alternate.

Group II: F. M. Gibson, Brooklyn, N. Y.; E. G. Bailey, New York, N. Y., first alternate; W. E. Caldwell, New York, N. Y., second alternate.

Group III: A. L. DeLeeuw, Plainfield, N. J.; Virgil M. Palmer, Rochester, N. Y., first alternate.

Group IV: B. E. Short, Austin, Texas; J. W. Eshelman, Birmingham, Ala., first alternate.

Group V: L. E. Jermy, Cleveland, Ohio; G. A. Young, Lafayette, Ind., first alternate; K. F. Treschow, Pittsburgh, Pa., second alternate.

Group VI: A. A. Luebs, Lincoln, Neb.; C. F. Moulton, Omaha, Neb., first alternate; W. L. De Baufre, Lincoln, Neb., second alternate.

Group VII: J. C. Othus, Corvallis, Oregon; Paul L. Heslop, Portland, Ore., first alternate; Franklin L. Davis, Portland, Ore., second alternate.

At a meeting of the committee held later in the week Charles M. Allen was elected chairman and B. E. Short secretary of the committee.

Revision of the Constitution of the A.S.M.E. was next on the order of business. President Batt reviewed the provisions in the Constitution for making such amendments to give a background for their presentation. Most of the discussion centered around a consideration of junior dues.

The revisions were read by H. N. Snelling, chairman of the Standing Committee on Constitution and By-Laws, and after discussion from the floor, in conformity with the Constitution it was voted that the proposed amendments be mailed to the membership for a letter ballot and that with these amendments there be included a brief statement from Mr. Snelling explaining their character and the general nature of the suggested changes.

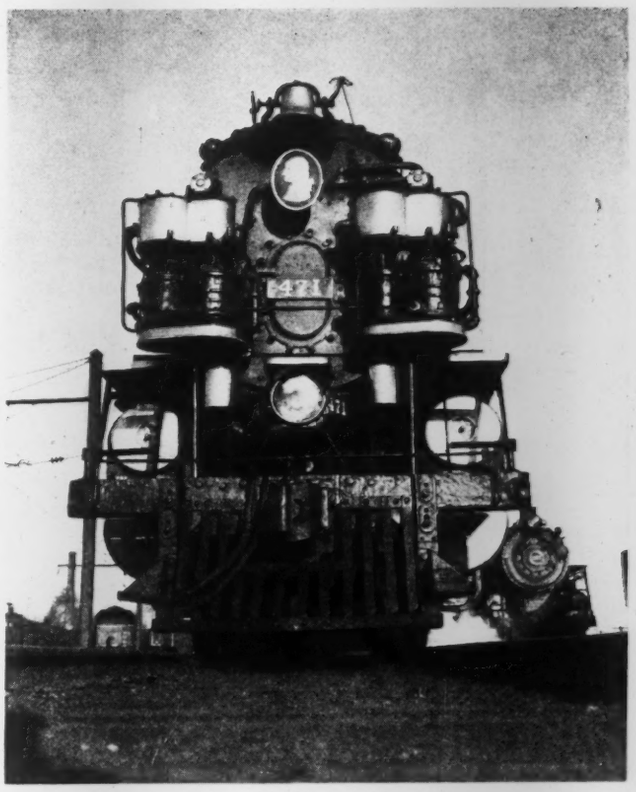
TECHNICAL SESSION BEGAN MONDAY NIGHT

Two enthusiastic and well-attended sessions on Monday night inaugurated the technical program of the 1936 Annual Meeting. Under the auspices of the Management Division the subject of time and motion study was discussed until a late hour, while simultaneously a session on heating and power was sponsored by the Power Division.

The success of these evening sessions, and of those on Thursday night, was so marked that the plan should be repeated in the future. It is doubtful if any sort of social entertainment would have drawn larger audiences than attended these two sessions. Interest in the junior member was largely responsible for the holding of these evening technical sessions, for they provided an opportunity for men unable to leave their work during the day to take part in the discussion of topics of broad technical significance.

Time and motion study was the subject discussed at the management session, and Dr. Lillian M. Gilbreth, internationally famous for the work she and her deceased husband have done in this field, acted as chairman. There were five formal discussions on the general subject by Ralph M. Barnes, of the State University of Iowa, Gertrude C. Ford, of Grove City (Pa.) College; W. R. Coley, of Leeds and Northrup Company, A. Williams, Jr., of the Hood Rubber Company; and Allan H. Mogensen, consulting engineer. A résumé of the discussions at these sessions is being prepared for publication in a later issue.

At the heating and power session, which H. B. Reynolds, member of the Committee on Professional Divisions served as chairman, two papers were presented and discussed. A. H. Senner, of the U. S. Department of Agriculture, presented a paper on domestic oil burners that appeared in the November issue of MECHANICAL ENGINEERING. The paper dealt with the description of types of oil burners and tests on them made at The Johns Hopkins University. A considerable amount of discussion followed the reading of the paper, and this will be published in a later issue.



"THE GEORGE WASHINGTON"—PHOTOGRAPH BY JOHN F. GUINAN SHOWN AT PHOTOGRAPHY EXHIBITION AT ANNUAL MEETING

The second paper was a description of a new type of high-pressure steam generating unit, called "Steamotive," designed for railway use. The paper appeared in full in the December issue of MECHANICAL ENGINEERING.

Great interest was aroused by this first public description of the Steamotive and tests on it, and the discussion was informative and extremely interesting. The significance of the entry of a steam unit into the high-speed rail-car field was not lost on the advocates of either steam or Diesel engines. In a future issue this discussion will be published. E. G. Bailey, of the Babcock and Wilcox Company, gave the principal presentation, and the coauthors of the paper, A. R. S. Smith, of the General Electric Company, and P. S. Dickey, of the Bailey Meter Company, assisted him in answering questions and closing the discussion. Long after eleven o'clock and the formal closing of the meeting, interested groups were discussing the paper among themselves.

SOME PAPERS YET TO BE PUBLISHED

To give even the briefest account of the many technical papers presented and discussed in the sessions which followed on Tuesday, Wednesday, and Thursday would require more space than this issue affords. Most of the papers were published in

R. J. S. PIGOTT

J. M. TODD

H. R. WESTCOTT

NEW VICE-PRESIDENTS OF THE 1937 A.S.M.E. COUNCIL

advance of presentation and may be found in MECHANICAL ENGINEERING or the Transactions and the discussions are being prepared for future issues of these periodicals. Only a few comments may be indulged in here, and most of these relate to papers not already published.

The fuel panel discussion, under the auspices of the Power Division, with E. B. Ricketts as chairman, was devoted to cinder catchers. Lack of time prevented completion of the discussion, but arrangements are under consideration for the publication in the near future of the material developed for that session.

Two papers sponsored by the Oil and Gas Power Division, while available in preprint form, were not received in time for publication before the meeting. They are to be published soon. A. Büchi, of Winterthur, Switzerland, was present to discuss the paper he had prepared on "Supercharging of Internal Combustion Engines With Blowers Driven by Exhaust-Gas Turbines." The paper by Lee Schneitter, of Ebasco, Inc., on "Diesel-Engine Operating, Maintenance, and Outage Data," will appear in an early issue of MECHANICAL ENGINEERING. Harte Cooke presided.

At the Railroad Division Session on Tuesday, with G. W. Rink presiding, A. Giesl-Gieslingen presented the progress report of the division. Much of the material presented was obtained by Dr. Giesl during a recent trip to Europe, and while copies of the report were available, no general publication has as yet been made. It is hoped to publish at least portions of the report within a few months. The other papers were published in advance of the meeting.

The Research Committee on Mechanical Springs and the Machine Shop Practice Division collaborated in a session, J. R. Townsend presiding, which was opened with a discussion of spring materials and progress on heavy springs. A paper on the performance of oil rings, reporting tests on a new type of grooved ring, presented by R. Baudry and L. Tichvinsky, of the Westinghouse Research Laboratories, will be published shortly. The demonstration lecture on Machinery Quieting, by E. J. Abbott, of the Physicists Research Laboratory, was based on a paper published in the November issue of MECHANICAL ENGINEERING.

In addition to the session on Monday night devoted to time and motion study, the Management Division held five other sessions on Distribution, Dealing With Workers Today, Maintenance, Training of Skilled Workers, and Plant Layout. Arrangements have been made to publish in a future issue reports of the papers and discussions at these sessions.

The highly successful evening session on the history of the steam turbine in the United States attracted many engineers and provoked much discussion and favorable comment. The paper on the Westinghouse turbine has already been published, in November MECHANICAL ENGINEERING. The papers on the Allis-Chalmers turbine and the General Electric turbine are in type and are scheduled for early publication in MECHANICAL ENGINEERING.

TECHNICAL COMMITTEE DISCUSSIONS

Unusually large attendance and close application to the work at hand characterized the technical committee meetings which paralleled the technical sessions. Fifty-one meetings were held: Research, 19; standards, 20; power test codes, 11; and safety, 1. The total attendance at these meetings was 598.

STANDARDS

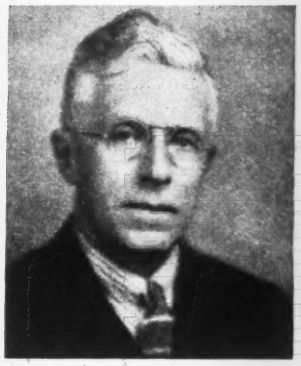
The A.S.M.E. Standards Luncheon was the central feature of the group of 20 standards committee meetings. It was held on Thursday noon and was attended by 55 chairmen and secretaries of standards committees.

Alfred Iddles presided at the head table as chairman of the A.S.M.E. Standardization Committee and introduced the guests of honor. President Batt was first on the list and after being introduced made a brief address pointing out the importance of making generally known to the industrial world the results of the excellent work which the committees represented at the luncheon were doing.

Other guests of honor were J. C. Irwin, chairman, Standards Council of the American Standards Association, F. M. Farmer, vice-chairman, and P. G. Agnew, secretary, A.S.A. Standards Council. The entire membership of the A.S.M.E. Standardization Committee was also present, consisting of Alfred Iddles, J. E. Lovely, Walter Samans, O. A. Leutwiler, and W. C. Mueller.

A meeting of the A.S.M.E. Standardization Committee was held on Thursday morning prior to the luncheon. All five members of the committee attended and in addition three of its former members, C. P. Bliss, A. M. Houser, and C. W. Spicer. Routine business occupied most of the committee's attention. Walter Samans was elected chairman for the coming year to fill the place made vacant by the retirement of Alfred Iddles whose five-year term of office expired on December 4. At this meeting and at the luncheon, the secretary announced that six standards had been completed and approved during the year by certain of the 32 sectional committees for which the Society is sponsor or joint sponsor.

Early Monday morning the subcommittee on tolerance systems, R. E. W. Harrison, chairman of the Sectional Committee



S. W. DUDLEY

K. H. CONDIT

E. W. BURBANK

NEW MANAGERS OF THE 1937 A.S.M.E. COUNCIL

on Allowances and Tolerances for Cylindrical Parts and Limit Gages, B4, opened the meeting with all members present and five guests. The activity to date was thoroughly discussed and important decisions were made affecting the work for the coming year.

The following morning an equally large number were present at the meeting of the subgroup on the gaging of screw threads, W. L. Barth, chairman. At this meeting the committee discussed a tentative proposal for a general screw-thread-gaging practice, copies of which had been distributed to the members prior to the meeting. The committee's proposal will now be revised in accordance with the criticisms and suggestions made by those present.

Three meetings were held by the group of committees engaged in setting up standards for surface quality and the procedures necessary to determine the quality of a surface, irrespective of the method of production, B46. H. K. Rutherford, chairman of the sectional committee, attended all three of these meetings which were presided over by R. E. W. Harrison, J. R. Weaver, and S. A. Einstein, respectively. At the close of this group of meetings it was generally agreed that important changes in the organization of the subcommittees should be made and that financial assistance to cover the production and measurement of samples be sought.

A meeting of the subcommittee on cast-iron flanges and fittings, A. M. Houser chairman, was held on Wednesday afternoon to review and discuss the thorough revision of this American Standard known as B16a–1928, copies of which had been distributed previously by mail to the members. Twelve attended this meeting and the revision was completed before the meeting adjourned at 5:45 p.m.

Ten persons attended the meeting Wednesday morning of the subcommittee which is charged with the responsibility of developing a standard specification for gasoline, oil, and grease separators for use in buildings. This subcommittee is headed by J. J. Crotty who presided at the meeting and is part of the general committee on minimum requirements for plumbing and the standardization of plumbing equipment, A40. The subcommittee on welding of branch connections, B31, E. R. Fish, chairman, also met at this time with ten members present.

The review of the completed draft of the proposed American Standard for Indicating Pressure and Vacuum Gages occupied the attention of the 15 members of the sectional committee, B40, who met on Thursday morning with M. D. Engle, chairman, presiding. The corrections and additions adopted at this time will be incorporated in a revision of the committee's proposal.

The annual meeting of the sectional committee on small tools and machine-tool elements, B5, C. W. Spicer chairman, held on Thursday afternoon, was attended by 36 members and visitors. At this meeting reports from its 20 technical committees were received. Progress was reported by Technical Committee No. 13 on Splines and Splined Shafts which had met the day previous and by Technical Committee No. 10 on Circular Forming Tools and Holders, W. C. Mueller, chairman. The latter at its meeting on Wednesday afternoon recorded the publication of its report on Circular and Dovetail Forming-Tool Blanks and began work on a proposal for circular and dovetail forming and cut-off tool holders and straight-blade cut-off tools and holders.

An important meeting in this group was that of Technical Committee No. 4 on Spindle Noses and Collets, J. E. Lovely, chairman, held on Tuesday morning. Completion and final approval of the report of the subgroup on lathe spindle noses was announced and plans for the future work of the committee's various other subgroups were made. Seven members attended the joint meeting of Technical Committee No. 2 on Tool Posts and Shanks, O. W. Boston, chairman, and Technical Committee No. 19 on Single-Point Cutting Tools, F. H. Colvin, chairman, also held on Tuesday morning. In the afternoon meetings were held by Technical Committee No. 16 on Rotating Tool Shanks, E. J. Bryant, chairman, and Technical Committee No. 17 on Nomenclature, O. W. Boston, chairman, this latter being attended by 12 members. The subgroup on steep tapers, W. A. Timm, chairman, held a meeting on Thursday morning at which eight members were present.

ADVISORY BOARD ON STANDARDS AND CODES

The A.S.M.E. Advisory Board on Standards and Codes held a luncheon meeting on Wednesday. Those present were V. M. Frost, representing the Boiler Code Committee, Francis Hodgkinson, representing the Power Test Codes Committee, H. H. Judson, representing the Safety Committee, and C. B. LePage, alternate for O. A. Leutwiler, representing the Standardization Committee. While Chairman Alex D. Bailey had come to New York planning to attend this meeting, he was called back to Chicago on urgent business the day previous.

SAFETY AND HYGIENE IN INDUSTRY

At dinner on Tuesday evening the A.S.M.E. Safety Committee held its annual meeting. H. H. Judson was elected to the chairmanship for the coming year and the nomination of Theodore F. Hatch, associate dust-control engineer, division of industrial hygiene of the New York State Department of

Labor, New York, N. Y., for appointment by President Herron as the new member of the committee to serve for a term of five years, was confirmed.

At this meeting it was reported that the revision of the Safety Code for Elevators, comprising the fourth edition, as well as the Elevator Inspectors' Handbook had been completed and are now before the sponsor organizations, the National Bureau of Standards, the American Institute of Architects, and The American Society of Mechanical Engineers for approval.

It was reported also by the secretary that a start has been made in the reorganization of the Sectional Committee on a Safety Code for Conveyors and Conveying Machinery, replies having been received from 21 cooperating organizations, to whom letters had been addressed, indicating their continued interest in the project. The committee recommended that the reorganization meeting of this sectional committee be called at an early date.

The activities of the A.S.M.E. Advisory Board on Standards and Codes were also discussed and Mr. Judson was instructed to report at the meeting of the Board which was to be held the following day the committee's recommendation that the Board be continued for at least two more years.

The technical session on Safety and Hygiene in Industry held on Tuesday afternoon was sponsored by the Safety Committee. Chairman W. M. Graff presided and the papers which were presented and discussed were as follows: "Practical Results from Safety Contests," by Harold Miner, "Engineer's Part in Industrial Hygiene," by W. P. Yant, and "Engineering Value of Adequate Operating Instructions," by Dan L. Royer. The session was well-attended by a keenly interested audience. W. P. Yant, one of the authors, holds the position of director of research at the Mine Safety Appliances Company, Pittsburgh, Pa., and it is interesting to note that the other two authors are members of the Safety Committee. In all probability some or all of the papers presented at this session will be published in a forthcoming issue of MECHANICAL ENGINEERING.

RESEARCH

Nineteen special and joint research committee meetings were held during the five days of Annual Meeting week. The joint committee on the Effect of Temperature on the Properties of Metals, H. J. French, chairman, led off on Monday morning with a well-attended meeting. Seventeen were present and the meeting continued all day, a third session being held on Tuesday afternoon to complete the business. Practically the entire time of these three sessions was devoted to a discussion of the work program of the Joint Committee. This program consists of six items the two most important of which are (1) tests of tubular specimens subject to internal pressures and elevated temperatures and (2) tests to determine the relationship between creep strain caused by torsion and creep strain caused by tension. The next morning the committee sponsored a technical session jointly with the Applied Mechanics Division at which H. J. French, chairman, presided and N. L. Mochel, secretary, assisted as recorder.

The Committee on Fluid Meters began its activities on Tuesday afternoon with a technical session on "Fluid Flow and Aerodynamics" sponsored jointly by the committee and the A.S.M.E. Aeronautic Division. R. J. S. Pigott presided in his capacity as chairman and J. R. Carlton assisted him as recorder. At the close of the technical session the committee went into executive session. Two items of general interest on its order of business were (1) the report of the finance subcommittee by D. C. Weeks for E. C. M. Stahl, chairman, that the total subscriptions to the fund for research on flow meters had reached $15,000 and that the amount of cash received to date totaled $10,700 and (2) the report of H. S. Bean to the effect that the editing of the revision of part I had been completed and that the reprinting of this publication was now in process. The subcommittee on the flow-nozzle study, H. S. Bean, chairman, held a meeting on the morning of that day.

The first meeting of the reorganized Special Research Committee on Lubrication was held on Thursday morning, December 3, with Nevin E. Funk, chairman of the A.S.M.E. Research Committee, presiding. The committee elected as its officers G. B. Karelitz, chairman, and S. J. Needs, secretary. The remainder of the time was given over to the program of the committee's work covering both the physics and chemistry of lubrication and practical service problems.

At its meeting on Tuesday, December 1, the Research Committee on Critical Pressure Steam Boilers, A. A. Potter chairman, devoted the time to a discussion of the reports on an investigation of the rate of reaction between steam and metals at high temperatures, and the viscosity of superheated steam. In view of the discrepancy in viscosity data for superheated steam at high pressures, it has been decided to make another determination by a different method from the one reported previously by Messrs. Hawkins, Solberg, and Potter. A new method of measuring head loss will be employed. The apparatus for the check method is practically complete, but insufficient funds for assistants are delaying the results.

The Research Committee on Wire Rope met on Wednesday, December 2, to decide whether or not it should plan for further activities. Chairman W. H. Fulweiler called attention to the fact that the report entitled "Inspection and Tensile Tests of Some Worn Wire Ropes," prepared by Messrs. W. H. Fulweiler, A. H. Stang, and L. R. Sweetman, had been published by the National Bureau of Standards in the September, 1936, issue of the *Journal of Research*. Reprint copies of this report will be available shortly. The discussion at this meeting developed the need for exact information concerning certain important factors which have a bearing on the useful life of wire rope. Accordingly, it was decided to meet again when this information had been gathered by the chairman and other designated members of the committee. H. L. Whittemore represented the National Bureau of Standards at this meeting.

As usual, the technical session conducted under the auspices of the Joint Research Committee on Boiler Feedwater Studies was very popular. More than 230 persons were present and the discussion was lively. C. H. Fellows, chairman of the committee, presided and J. B. Romer, its secretary, acted as recorder. Progress reports on the researches dealing with embrittlement and dissolved-oxygen determination were presented together with a paper by F. G. Straub on the "Reactions of Sodium Sulphite Under Boiler Operating Conditions." This session was held on Thursday afternoon, and the following Friday afternoon the executive committee of this group held a business session. The Subcommittee on Alkalinity and Sulphate Relations in Boiler-Water Salines, J. H. Walker, chairman, had met on Thursday, December 3, and it was its progress reports on embrittlement and dissolved-oxygen determination which were presented and discussed at the session previously mentioned.

On Wednesday morning the Research Committee on Cutting of Metals jointly with the Machine Shop Practice Division conducted a technical session on Metal Cutting. Coleman Sellers, 3d, the chairman of the committee, presided and the following three papers were presented: "A Study of Cutting Fluids Applied to the Turning of Monel Metal," by O. W. Boston and W. W. Gilbert; "Cemented Carbide Tool Maintenance and Application," by L. J. St. Clair; and "Comparative Torque and Horsepower Requirements of Standard Four-Flute and Spe-

cial Flute Taps," by H. L. Daasch. That noon the special research committee and its subcommittee on Cutting Fluids held luncheon meetings.

What may be the last meeting of the Special Committee on Metal Cutting Data for some time was held on Wednesday afternoon. L. P. Alford, chairman, presided and R. C. Deale, secretary, and technical assistant, made his final report. The manuscript for the "Handbook on the Cutting of Metals with Single Nose Tools" is now practically completed so it should be in form to go to press soon after the first of the year.

The luncheon meeting of the Special Research Committee on Condenser Tubes was held on Wednesday, December 2, at which a report was made on the rather extensive survey that has been under way during the first nine months of 1936 of the present condenser-tube corrosion situation for the purpose of allocating the effects of the various factors which influence the rate of the deterioration.

Six members of the Special Research Committee on Vessels under External Pressure, W. D. Halsey, chairman, were present at the meeting of the committee on Wednesday, December 2 which was held for the purpose of considering a suitable method for extending the principles of the present rules in the code to vessels constructed of material other than low-carbon steel and also to vessels at higher temperatures than those permitted in the rules.

Wednesday morning the Research Committee on Mechanical Springs, J. R. Townsend, chairman, held its regular annual meeting at which nine persons were present. Dr. D. J. McAdam reported the progress which he had made to date on the manuscript of the "Résumé of the Physical Properties of Spring Materials." This report encouraged the committee to believe that by February 1 it would have before it this manuscript complete and ready to release for printing. The reports made by Secretary C. T. Edgerton and F. P. Zimmerli completed the study of helical springs and the committee decided to direct its attention now to a study of flat springs. That afternoon the committee joined with the Machine Shop Practice Division in sponsoring a technical session on machinery and springs at which three papers on the general subject of the committee's work were read. Chairman Townsend presided at this session.

POWER TEST CODES

Eleven meetings of committees in this group were held during the week. Two recently reorganized committees, Committee No. 2 on Definitions and Values and Committee No. 8 on Centrifugal and Rotary Pumps began their work. Committee No. 18 on Hydraulic Prime Movers held an all-day session on Thursday, December 3. Other committees which met were No. 6 on Steam Turbines, No. 21 on Dust-Separating Apparatus, No. 4 on Stationary Steam-Generating Units, No. 10 on Fans, No. 9 on Displacement Compressors and Blowers, and No. 19 special Subcommittee on the Measurement of Fluid Flow. The main committee held its meeting on Friday morning.

Six members attended the meeting of Committee No. 2 on Definitions and Values, R. J. S. Pigott, chairman, held on Wednesday afternoon, December 2, at which plans were laid for a thorough revision of this important unit of the group of publications on the testing of prime movers. When possible two meetings a year will be held but the greater part of the business will be conducted by correspondence. It is proposed to consider a rearrangement of the entire code with a view to improving the tables so that they will be easier to read and cheaper to print and to spend considerable time in improving the explanatory paragraphs.

Committee No. 6 on Steam Turbines, C. H. Berry, chairman, met at breakfast on Thursday, December 3, at which Francis Hodgkinson, chairman of the special subcommittee of three announced the completion of the proposed revision of the Test Code for Steam Turbines. The preliminary draft of this revision is to be reproduced first in mimeograph form and will be available soon to those specially interested in the revision of this test code.

The reorganized Committee No. 8 on Centrifugal and Rotary Pumps, M. B. MacNeille, chairman, held its first meeting on Wednesday, December 9, and reviewed the draft of the code on this subject recently completed by the Hydraulic Institute. This committee plans now to proceed with the redrafting of the Test Code for Centrifugal and Rotary Pumps and to arrange for certain necessary research at the California Institute of Technology.

Subcommittee on Fans, M. C. Stuart, chairman, met on Friday afternoon, December 4, and spent several hours reviewing the proposed draft of the Test Code for Fans.

Committee No. 9 on Displacement Compressors and Blowers, Paul Diserens, chairman, also met on Friday afternoon, and reviewed suggestions and material which has been gathered for incorporation in the proposed revision of this test code.

An all-day session of Committee No. 18 on Hydraulic Prime Movers was held on Thursday, December 3. Nine members of the committee and alternates were present and the committee reviewed a voluminous amount of material which had been received as a result of the distribution of the draft of the code for criticism and comment. While the committee worked diligently it did not complete the task before it so a subcommittee was appointed to complete the incorporation into the present draft the changes and additions on which agreement can be secured.

The Instruments and Apparatus Special Subcommittee on the Measurement of Fluid Flow, W. A. Carter, chairman, met on Thursday, December 3, and at the same time Committee No. 21 on Dust-Separating Apparatus, M. D. Engle, chairman, held its meeting. The latter reported that the material which it has been able to gather together justifies it in expressing the expectation that a preliminary draft of a test code for this type of apparatus will be available sometime during 1937.

There was an unusually large attendance on Friday morning at the meeting of the A.S.M.E. Committee on Power Test Codes, R. H. Fernald chairman. The routine business of this standing committee included the reports of the eleven technical committees which are now at work on new test codes or revisions of old ones. Some of the information contained in these reports is given in preceding paragraphs. In addition, it can be stated that E. R. Fish, chairman, of Committee No. 4 on Stationary Steam-Generating Units, reported, as the opinion of his committee, the desirability of formulating a test code for steam-generating units on a heat-balance basis. Another subject which received some attention at the meeting is that of tolerances. Francis Hodgkinson referred to the wording of the paragraph on this subject in the proposed revision of the Test Code for Steam Turbines and, since this wording seemed good to those present, it was finally agreed that the secretary send copies of this wording to the chairmen of the various individual committees for their information and consideration.

WESTINGHOUSE COMMEMORATION

One of the most delightful and interesting features of the 1937 Annual Meeting was the Westinghouse Commemoration, held in the Auditorium on Tuesday, December 1.

This event was the result of an action of the A.S.M.E. Council, taken on December 7, 1934, which authorized the president to appoint a special committee to make plans for the 90th birth-

C. F. SCOTT J. R. ANGELL P. D. CRAVATH

PROMINENT FIGURES AT THE WESTINGHOUSE COMMEMORATION

day anniversary of George Westinghouse. The committee appointed consisted of the following: Roy V. Wright, chairman; S. W. Dudley, James H. McGraw, Charles F. Scott, Ely C. Hutchinson, J. B. Wright, and W. G. Marshall.

This action of the Council was based on a report presented by C. N. Lauer which read as follows:

> The engineer is on the defensive in justifying his work and establishing himself as a constructive element in civilization and a driving force in providing for the well-being of mankind.
>
> The American Society of Mechanical Engineers has a responsibility in safeguarding the position of the engineer, and in discharging that responsibility should embrace the opportunity to dramatize the contributions of the outstanding leaders in engineering invention, design-construction, and application.
>
> Such an opportunity occurs in 1936 in the celebration of the 90th birthday of George Westinghouse. As past-president, honorary member, and John Fritz medalist, Mr. Westinghouse has helped to establish, and is representative of, the most treasured traditions of the A.S.M.E. It is fitting, therefore, that this Society should grasp the opportunity to make plain to the public the far-reaching results of the work of this great engineer on the occasion of the 90th anniversary of his birth. To that end it is suggested that the Society appoint a committee to consider what action may be taken that will demonstrate the effects that the achievements of George Westinghouse have had upon the welfare of mankind.
>
> It is suggested that the committee include in its plan a provision whereby the participation of all branches of the profession and all industries that have benefited by Mr. Westinghouse's work will be assured.

As plans for the proposed commemoration took shape, Charles F. Scott, member, A.S.M.E., professor emeritus of electrical engineering at Yale University, and one of Mr. Westinghouse's former associates, undertook a careful survey of Westinghouse material and conducted a series of conferences with men who had been in the employ of the former honorary member and past-president of the Society who was thus to be honored.

The program that was eventually worked out consisted of two parts; an afternoon session at which former friends and associates of Mr. Westinghouse brought personal testimony of his engineering achievements, and an evening session at which President Angell, of Yale University, and Paul D. Cravath, long a member of Mr. Westinghouse's legal counsel, delivered formal addresses.

After much careful planning and consultation Professor Scott was able to secure the consent of nearly twenty men who knew Westinghouse well to appear together as a group of former associates and friends to present their tributes in public. By skillful planning the tributes were prepared and worked into a "continuity" which formed the basis of the commemoration exercises of Tuesday afternoon.

Seated on the platform were Professor Scott, President Batt, Roy V. Wright, past-president A.S.M.E.; Samuel Vauclain, of the Baldwin Locomotive Works, honorary member A.S.M.E.; Ralph Budd, president, Burlington Lines; W. W. Nichols, assistant to the chairman, Allis Chalmers Manufacturing Company; Thomas Campbell, oldest employee of the Westinghouse Air Brake Company; A. W. Berresford, past-president, A.I.E.E.; L. B Stillwell, consulting electrical engineer, retired, past-president, A.I.E.E.; C. R. Beardsley, superintendent of distribution, Brooklyn Edison Company; Francis Hodgkinson, consulting engineer, retired; Westinghouse Electric and Manufacturing Company; Frank W. Smith, president, Consolidated Edison Company; N. W. Storer, consulting engineer, retired; Westinghouse Electric and Manufacturing Company; E. R. Hill, Gibbs and Hill, Consulting Engineers; J. V. B. Duer, chief electrical engineer, Pennsylvania Railroad Company; and John F. Miller, vice-chairman, Westinghouse Air Brake Company.

In view of the fact that plans have been made to publish the tributes in full at a later date, no attempt will be made here to give more than a brief outline of what was said.

President Batt opened the session by announcing the purpose of the exercises and calling attention to Mr. Westinghouse's achievements in the progress of power and transportation. He then turned the ceremonies over to Professor Scott, who called on Ralph Budd to tell what the railroads owe to Westinghouse. Throughout his presentation, as indeed during the remainder of the sessions, pictures and diagrams illustrating the remarks of the speakers were thrown on the screen.

After briefly outlining the inception of the air brake in Westinghouse's mind, Mr. Budd called on W. W. Nichols who told of the critical events that transpired when he, in charge of the Burlington's dynamometer car, participated in the historic Burlington air-brake trials.

Mr. Budd then read a letter from Ambrose Swasey, following which Professor Scott called upon Mr. Campbell to tell how he had been attracted to Mr. Westinghouse's employ because of high wages, the piecework system, the use of molding machines in the foundry, Saturday half holidays, and the many considerations and kindnesses Mr. Westinghouse showed to his men.

Then came the most dramatic moment of the afternoon, for in telling how Mr. Westinghouse, when boarding with William Anderson, in Edgewood, used to enjoy the lively Scotch and Irish airs he played on his piccolo, Mr. Campbell pulled that instrument from his pocket and played several of the old favor-

ites, drawing thunderous applause from the admiring audience. Mr. Campbell, who is more than 80 years old, was chosen as the model for the mechanic for the Westinghouse Memorial that stands in Schenley Park, in Pittsburgh.

Turning to electric power, Professor Scott recalled Westinghouse's contribution to the development of alternating current, and called upon Mr. Berresford, who had served as chairman of the committee of the American Institute of Electrical Engineers that recently staged the "Fifty Years of Alernating Current" for the Institute. Following Mr. Berresford, L. B. Stillwell told of the early days of the transformer and Mr. Westinghouse's connection with it and the developments at Niagara, in which Mr. Stillwell participated.

How the direct-current distribution systems of metropolitan districts were changed over into alternating-current network was illustrated by Mr. Beardsley's contribution on the development of the Brooklyn Edison Company, first of the large systems to complete the change.

The story of the steam turbine, with personal anecdotes, was told by Francis Hodgkinson, whom E. E. Keller, who negotiated the lease of the Parson's patent, brought to the Westinghouse organization to take charge of turbine design and construction.

What the electric-lighting companies owed to Mr. Westinghouse was outlined, with personal reminiscences, by Frank W. Smith, who showed how the introduction of the steam turbine had cut down the annual coal consumption, labor and maintenance costs, and space required for the engine room. On the basis of 160,000 kw, the largest turbine units of the Consolidated system, the saving in power supply for New York City in oilers' labor amounts to $5,000,000 per year and in the cost of coal $30,000,000 per year.

Mr. Storer, at Professor Scott's request, told of Mr. Westinghouse's early contributions to railway electrification, and Mr. Vauclain recounted how the agreement between the Westinghouse Company and the Baldwin Locomotive Works had come about, and of the manner in which Mr. Gibbs had been engaged as consulting engineer for joint electrification projects. Mr. Hill then spoke briefly of the electrification of the New Haven, and Mr. Duer told of the more recent work done on the Pennsylvania Railroad.

On the subject of industrial organization, particularly as it developed in the Westinghouse Air Brake Company, Mr. Miller bore testimony, with anecdotes of early ventures in "Social Security" by Mr. Westinghouse and further examples of his forward-looking treatment of his employees.

In closing the session, Professor Scott said:

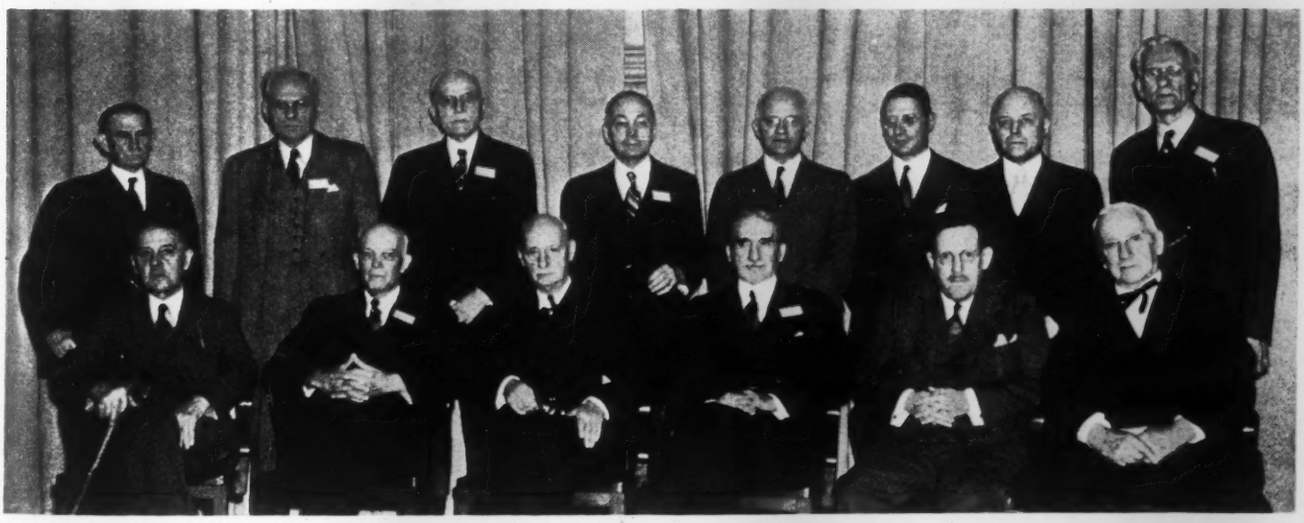
> These reminiscences of Westinghouse show concretely how he amplified the beginnings made by Watt and Stephenson and Faraday in power and transportation and electricity, making them of vastly greater service. And in doing these things he delighted in creating new industries which gave useful employment to many men. His success may be gaged in dollars—the pay rolls of the Electric Company alone aggregate $1,500,000,000. The output of his industries have aided others by furnishing machinery and power.
>
> But in larger terms his whole career offers a solution to a pressing problem of our new industrial order. He solved technological unemployment by creating new employment—new inventions, new industries. His aim was not the accumulation of riches but the creation of new wealth. He was a pioneer leading the way through the perplexities of a confused and changing civilization to the realization of its new possibilities.

HONORS NIGHT

The first public social event of the meeting, Honors Night, took place in the Auditorium on Tuesday evening. The members of the Council and participants in the ceremonies of Honors Night dined together at the Engineers' Club. Samuel Vauclain, honorary member, A.S.M.E., was present at the dinner and spoke briefly, and a letter was read from Nathaniel Greene Herreshoff, also an honorary member.

In addition to the customary procedure of awarding honors and introducing the president-elect, two memorial addresses in tribute to George Westinghouse constituted part of the program.

To the strains of appropriate music, guests were seated in the auditorium and the participants in the exercises of Honors Night assembled on the platform. Mr. Batt presided, calling first for a report of the tellers of election, which was read by C. E. Davies, secretary, A.S.M.E. The officers elected by vote of the members to serve for the year 1936–1937 were announced as follows: James H. Herron, president; James M. Todd, James A. Hall (deceased), and R. J. S. Pigott, vice-presidents;



ON THE PLATFORM FOR THE WESTINGHOUSE COMMEMORATION

(Standing, left to right: J. F. Miller, N. W. Storer, Thomas Campbell, Francis Hodgkinson, A. W. Berresford, C. R. Beardsley, Roy V. Wright, C. F. Scott. Seated: L. B. Stillwell, W. W. Nichols, Frank W. Smith, E. R. Hill, J. V. B. Duer, Samuel Vauclain.)

W. H. CARRIER

L. B. STINSSON

MR. CARRIER PRESENTED MR. STINSON FOR THE UNDERGRADUATE AWARD

and S. W. Dudley, K. H. Condit, and E. W. Burbank, managers.

Amid applause President-Elect James H. Herron was escorted to the platform by Past-Presidents C. N. Lauer and R. E. Flanders and was presented to the audience by President Batt. In acknowledging the applause Mr. Herron expressed his deep appreciation of the honor done him. He had "no policies," he said, but he felt that the Society might wisely follow the constructive suggestions Mr. Batt had made in his presidential address at the business meeting. (See pp. 5 to 8 of this issue.) He bespoke the cooperation of all members of the Society and expressed the hope that at the end of his administration they might be able to say to him, "Well done, good and faithful servant."

Mr. Batt then reminded the audience of the recent death of James A. Hall, of Providence, whose name had just been read as one of the newly elected vice-presidents. He then read the resolution adopted by the Council on the previous day, already quoted in full elsewhere in this report.

In accordance with the customary procedure for Honors Night, Willis H. Carrier then presented for the Undergraduate Student Award, Leon B. Stinson, of the Oklahoma Agricultural and Mechanical College for his paper "Polymerized Motor Fuels; Their Economic Significance," with a brief comment on the paper and its author. Mr. Batt greeted Mr. Stinson and handed him the award. A similar procedure was followed with each of the other recipients of awards, all of whom were greeted with enthusiastic applause. The awards were made as follows:

The Post Graduate award to DeWitt D. Barlow, Jr., for his paper "The Cubical Speeds of Lateral Vibrations of Shafts with Gyroscopic Effect." Mr. Barlow was unable to be present to receive the award.

Junior award, to Harwood F. Mullikin, Jr., of New York, for his paper, "Evaluation of Effective Radiant Heating Surface and Application of the Stefan-Boltzmann Law to Heat Absorption in Boiler Furnaces;" presented by Harte Cooke.

Melville Medal, to H. A. Stevens Howarth, of the Kingsbury Machine Works, Philadelphia, Pa., for his paper, "The Loading and Friction of Thrust and Journal Bearings With Perfect Lubrication;" presented by R. C. H. Heck.

Worcester Reed Warner Medal, to Charles M. Allen, of the Worcester Polytechnic Institute, Worcester, Mass., for his early and continued hydraulic laboratory work and for the permanent value of the papers on his development of methods of testing large hydraulic turbine installations; presented by L. P. Alford.

The A.S.M.E. Medal to Edward Bausch, Bausch and Lomb Optical Company, Rochester, N. Y., for meritorious mechanical developments in the field of optics; presented by James Gleason.

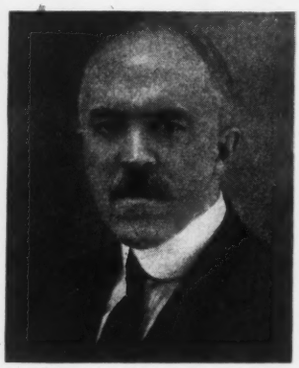
President Batt then called upon Lionel S. Marks who presented Geo. A. Orrok to receive the distinctive recognition of his engineering attainments in the form of honorary membership in The American Society of Mechanical Engineers. Professor Marks said:

Mr. President: It will shortly be my privilege to present to you Mr. George Alexander Orrok, who is to receive from your hands one of the most distinguished honors which this Society can confer.

For over forty years George Orrok has been a practicing engineer, working largely in the field of power, and for thirty years was mechanical and consulting engineer with the New York Edison Company. During this time he has been an increasingly important figure in his field and has built up an outstanding reputation on the basis of his professional work and of his numerous important contributions to engineering literature. His contributions have been outstanding not only for their pragmatical value to the engineer but also because they have been illumined by an unusual sense of the continuity of engineering development. He has tied up the past with the present.

We are indebted to him even more for the enthusiasm with which he has stimulated the technical and scientific work of this Society, most notably in connection with the elaborate researches on the properties of steam, which, after fifteen years, have resulted in an International Steam Table.

But most of all we honor him for his personal qualities. There are



R. C. H. HECK

H. A. S. HOWARTH

PROFESSOR HECK PRESENTED MR. HOWARTH FOR THE MELVILLE MEDAL

H. F. MULLIKIN, JR.

W. L. BATT

MR. MULLIKIN RECEIVED THE JUNIOR AWARD AT HONORS NIGHT AT WHICH MR. BATT PRESIDED

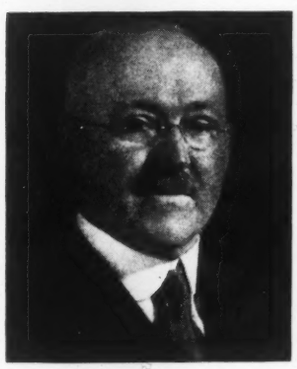
hosts of young men who have sought his advice and assistance and who spoke of him affectionately as "Uncle George." There are innumerable older men who have found him always ready and willing to give them the benefit of his wide experience. And a specialty of his has been his general adoption of European engineers. When traveling in Europe one can be fairly sure that each engineer with whom one converses will say, sooner or later, "And how is that nice Mr. Orrok?" It seems almost as if he had a permanent station at the foot of the Statue of Liberty from which he took charge of visiting engineers and introduced them to the mechanical wonders of his country.

In addition to being our unofficial ambassador, he has also been for many years a roving lecturer at many of the principal engineering schools of the East and has given a sense of background and an outlook to a multitude of students.

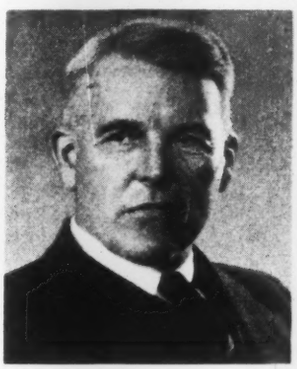
It is therefore with the greatest pleasure that I present to you Mr. George Alexander Orrok.

With the audience on its feet and applauding with genuine enthusiasm, President Batt graciously congratulated Mr. Orrok and handed him the certificate of his honorary membership.

Following a brief intermission, during which all but President Batt, President Angell, and Mr. Cravath left the platform, the session resumed with two addresses on Westinghouse. James Rowland Angell, president of Yale University, who had been designated Towne Lecturer for 1936, spoke on "The Achievements of George Westinghouse as Factors in Our Modern Life," and Paul Cravath, on "George Westinghouse, the Man." In an early issue of MECHANICAL ENGINEERING the addresses by President Angell and Mr. Cravath will be published

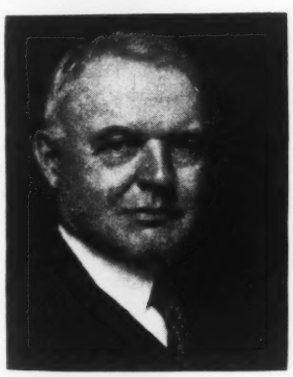


L. P. ALFORD



C. M. ALLEN

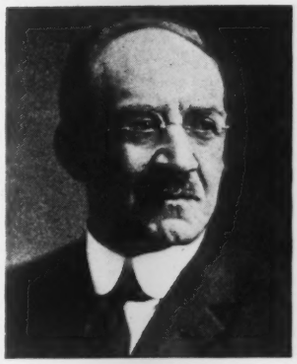
MR. ALFORD PRESENTED PROFESSOR ALLEN FOR THE WARNER MEDAL



JAS. E. GLEASON

C. L. BAUSCH

MR. GLEASON PRESENTED MR. BAUSCH FOR THE A.S.M.E. MEDAL



L. S. MARKS

GEO. A. ORROK

PROFESSOR MARKS PRESENTED MR. ORROK FOR HONORARY MEMBERSHIP IN THE A.S.M.E.

in connection with the tributes that had been paid Mr. Westinghouse during the afternoon exercises already mentioned.

DINNER TO MR. SWASEY

The Annual Dinner, held as usual at the Hotel Astor on Wednesday evening with an attendance of 800 was a brilliant and inspiring occasion. It was of more than usual significance as it was made the occasion of honoring Ambrose Swasey, past-president and honorary member of The American Society of Mechanical Engineers, whose ninetieth birthday fell on December 19. A full account of the events and speeches relating to Mr. Swasey is given elsewhere in this issue. An organ processional played by Leslie N. Leet, member, A.S.M.E., opened the dinner.

In addition to the exercises at the dinner relating to Mr. Swasey was the awarding of Fifty Year Medals to the following "Fifty Year Members:" Matthias A. Beck, C. H. Foster, Norman D. Fraser, Horace B. Gale, George F. Higgins, Daniel E. Moran, John S. Unger, and William M. Whitney.

Following the dinner the Presidents' Reception was held in the Laurel room, after which dancing continued until 2 o'clock.

WOMEN'S PROGRAM

In addition to attending the public social events of the A.S.M.E. Annual Meeting, women visitors were provided with a special program of interesting entertainment by the Women's Auxiliary.

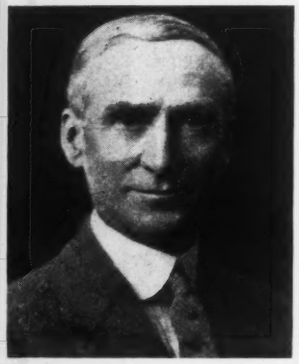
The objects of the auxiliary are social and philanthropic. Entertainments are given throughout the year, the proceeds from which, together with the dues of the members, are placed in a fund and used to extend loans to mechanical-engineering students who, during their junior or senior year, may become financially embarrassed. After graduating the students pay interest and repay the loan when able to do so. Thus a small revolving fund provides needed aid for a great many unfortunate young men.

Mrs. William H. Boehm has been twice chosen president of the auxiliary, and she is assisted by the following officers: Mrs. Calvin W. Rice, Mrs. E. J. Prindle, and Mrs. A. A. Adler, vice-presidents; Mrs. H. D. Thomas and Mrs. F. G. McCann, secretaries, and Mrs. A. H. Morgan, treasurer.

On Monday noon, Miss Eloise Davison, director of the Herald-Tribune Institute, spoke at a luncheon held at the Engineering Woman's Club, following which there was an inspection of the Institute.

Excursions and special trips were arranged to visit the fol-

LILLIAN M. GILBRETH



D. S. KIMBALL

MRS. W. H. BOEHM

AT THE ANNUAL LUNCHEON OF THE WOMEN'S AUXILIARY

lowing: Frick Museum, The Brooklyn Edison "Wonder House," Coty "Les Parfums," Metropolitan Museum of Art, Nippon Club, and an Exhibition of European and Early American Toys.

On Tuesday morning a visit had been arranged to the Frick Museum, where J. W. Fosburg spoke on some of the exhibits in the museum.

At the Annual Luncheon on Tuesday, held at the Hotel Commodore, Dexter S. Kimball, past-president, A.S.M.E., spoke on "Learning, Morals, and Manners." He was introduced by Dr. Lillian Gilbreth.

Dean Kimball, whose address was a subject for comment by the Metropolitan press, said in part:

Three factors that influence greatly that elusive thing that we call character are learning, morals, and manners. They are not necessarily connected with each other. A man may be learned but have neither morals nor manners; he may have high moral standards without either learning or manners; or he may have any of the possible combinations of the three. All will agree that these are highly desirable qualities in the college graduate. The older English universities with their longer experience and with England's peculiar needs in mind long ago placed learning, morals, and manners on the same plane of importance. And a training at these universities or at the so-called public schools, such as Eton, is, I am told, as much a training in manners as in learning. "In the Ages of Faith Oxford and Cambridge produced clerics, in the Renaissance scholars and humanists, in modern times capable governors, while the specialist has been a by-product in all periods." Our American universities and particularly the land-grant college group with their somewhat limited experience and concerned as they have been primarily with the economic problems of a new country have tended to lay greatest stress on learning, to place morals as a secondary consideration, and for the most part to let manners fall where they may.

As our country matures we shall undoubtedly tend increasingly to follow the procedures of the older seats of learning. There are already many indications in this country that the problem of good manners among university students is to receive much more attention than hitherto. I think this must necessarily be so if we are to achieve desired results. In any case I believe the time has come when the relative value of learning, morals, and manners in university life must be given more careful consideration than in the past. And this may lead to some far-reaching results because as has been noted, learning, morals, and manners are independent variables and do not necessarily spring from any one phase of instruction. Perhaps the development of morals and manners demands influences and personnel that exist only in rudimentary forms as yet in most college precincts.

The portions of Dean Kimball's address which attracted most attention concerned manners, about which he said:

I believe there has been a distinct decadence and student manners are not as good as they were. I am aware that it is quite usual to speak of the social customs of forty years ago with amused tolerance. But men of my years will insist that the social life of those days possessed a dignity, courtesy, and elegance that the modern student world might try to recapture with profit to itself. The difference is so marked in so many ways. A few weeks ago I heard that great orchestra in the Radio Music Hall render Strauss' "Tales From the Vienna Woods," and it was to me reminiscent of certain social niceties that are no more. The next night in Ithaca I heard a modern jazz orchestra hammering out the jungle tom-tom discords that the modern student classifies as dance music. I confess that I cannot bring myself to believe that the distance between the two performances measures social progress.

I am always disturbed when a freshman comes into my office with his little cap on his head and a cigarette in his mouth. I am distressed when he reappears as a senior, hat on head and pipe in mouth, having made no progress in good manners but like Omar of old coming "out the selfsame door wherein he went." Much of our campus automobile trouble is caused simply by bad student manners, and the utter disregard of the sensitiveness of some older people to tobacco on the part of students of both sexes betokens thoughtlessness at least. In my opinion, also, the much greater freedom between the sexes has tended to break down certain niceties of good manners, though probably it does not indicate lowered moral standards.

I have lived in frontier towns and have seen social life at low levels I saw San Francisco's Barbary Coast and New York's Bowery when they were in their prime and cannot therefore be accused of being uninformed or unsophisticated. And yet because of these experiences or in spite of them the sight of a young woman sitting at a bar lapping up cocktails deeply offends my sensibilities. And, mark you, I object less to her drinking the cocktails than I do to her presence in the bar. Cocktail drinking may be a harmless or a hazardous occupation depending upon the time, the place and the company; but a bar room is always low, always common, never conducive to good manners and the young woman who enters one lowers herself in her own estimation and in that of her escort, if he has any manly instincts. And so on *ad infinitum*.

The causes of this decadence are several if not many. First I would place the general effect of the great war which gave our social structure a severe wrenching. And second our colleges and universities are and have been for some time drawing students from social strata that heretofore have not been represented so largely upon the college campus. It is a natural manifestation of our attempt at universal education. Of course, there are still many students who can say with Marcus Aurelius, "From my grandfather Verus I learned good morals and the government of my temper. From the reputation and remembrance of my father modesty and a manly character. From my mother, piety and beneficence and abstinence not only from evil deeds but from evil thoughts." But I believe the proportion of such students is less than formerly though here again we should be careful not to confuse bad manners with bad morals. However, I am less concerned with the causes than I am with the remedies if there be such and I think myself that something constructive could be done.

First there must be a recognition on the part of trustees and faculties that the college graduate should be not only educated to the extent that

is possible, but also that he should be moral and well-mannered. This has already been recognized by some educational groups. The Newark College of Engineering for several years invited Mrs. Joseph Barker to deliver a series of talks to its students on this subject and her little booklet "The Technique of Good Manners" will repay reading. The new housing plans of Yale and Harvard are moves in this direction. One of the best attempts known to the writer is Balch Hall, a residential hall for women at Cornell. This building consists of four units each housing 75 girls and each with its own housemother, dining room, and social rooms. The student union building now becoming so popular can do much I think to set higher social standards, especially as concerns social functions such as dances. It is along these lines I believe that progress may be made and once the full significance of this need is appreciated it will greatly affect all of our ideas of housing for students, both men and women. The American dormitory for men is in general an "abomination before the Lord." There is usually not a single refining influence within its walls. The fraternities are generally not much better, although here are groups in which much could be accomplished.

I have in mind one such group not exactly a fraternity but similar in many ways. In the beginning for a number of years it was composed exclusively of engineering students and they were so fortunate as to be given a beautiful endowed house, the donor of which contributed considerable initial idealism to the organization. This group has succeeded in establishing a fraternity life that impresses itself upon the scholarship and manners of succeeding generations of students to a greater degree than any other of which I have knowledge. If a boy lives in the house a while he cannot fail to feel its beneficent influences. And what this house has done, others can do if they are only so minded.

The question naturally arises as to whether the American male student can be regimented in his social surroundings, having enjoyed the widest liberty consistent with the accepted moral and legal code. Probably this cannot be done without considerable difficulty and the tendency at present is for men and women to demand greater personal liberty upon the campus. Whatever is done must probably be done by precept and by example and by surrounding the student with social influences and standards which he cannot escape. These must necessarily be closely connected with facilities for living at the university and may change somewhat the accepted and somewhat stereotyped conception of residential halls. It probably means a somewhat different conception of university life on the part of trustees and faculty or possibly it may mean a different type of trustee and faculty member. Possibly we should start by securing trustees and teachers who are learned, highly moral, and well-mannered though I am not sure that some of us would enjoy such a highly rarified atmosphere. But it might produce the desired results for the old proverb truly says—"Good life and Manners maketh the man."

DISCUSSION SESSIONS AND LUNCHEONS

There were a number of sessions at the Annual Meeting at which no formal papers were presented but rather a round-table discussion of the subject.

The management sessions on time and motion study, plant layout, dealing with workers today, training skilled workers and the distribution and maintenance luncheons will all be covered in a later issue by members of the Management Division of the Society who have agreed to prepare running accounts for publication.

The same treatment will be accorded the session on cinder catchers, an account of which will be published later.

However, we are able to give in this issue short accounts of the lubrication, fluid mechanics, and engineering education sessions which were held as after-luncheon affairs and the boiler-feedwater session.

Lubrication Luncheon

Prof. G. B. Karelitz, of Columbia University, writes concerning the luncheon of the lubrication group:

The luncheon held at Midston House on Tuesday, December 1, was presided over by W. F. Parish.

F. C. Linn of the General Electric Company, West Lynn, Mass., pointed out that the theory of bearings lubricated by a copious supply of oil under forced feed has now been quite well worked out. Moreover, high-speed bearings, i.e., larger bearings running at linear speeds from 8000 to 15,000 fpm, or small bearings running at 15,000 rpm, present problems of their own.

The journals of machine bearings tend to occupy a nearly central position in the bearing shell, which is conducive to instability and whirling of the shaft in the clearance. Current literature mentions the possibility of a resonance in the oil film, but experience does not bear this out. Rather, a state of whirling may be observed at speeds above the critical speed of the machine. The phenomenon should command more attention from future researchers in the field.

The losses in high-speed bearings are considerable. In gear-driven turbogenerator units the bearing losses, caused by the high shear rate in the oil films, may reach 5 or 6 per cent of the prime mover's total capacity. The losses are a function of viscosity, speed of rotation, unit pressure on the bearing, diameter of the bearing, its length, its clearance, the quantity of oil supplied. The effect of each variable upon the losses must be given further scrutiny.

The question of safety in these high-speed bearings is also important. No "metal-to-metal" contact may be allowed in these bearings. Because of considerable linear speed, local heat is generated at a high rate and damage may occur before the lubrication can be restored or the operating conditions rectified. The load-carrying capacity of a bearing depends on the same factor as the losses. The particular effect of the shell length and oil supply should be further investigated.

Friction studies on these high-speed bearings are best carried out by observing the temperature rise of the lubricating oil through the bearing. This, together with the rate of oil flow, gives a true measure of the power loss in the bearings. The effect of heat flow along the journal may be minimized by keeping the auxiliary bearings of the test journal at the same temperature as the test bearing.

R. J. S. Pigott, of the Gulf Research Corporation, Pitsburgh, Pa., was the second speaker. He described the testing machine they had developed recently, the design of which eliminates the imperfections inherent in a number of existing bearing-testing machines. The journal is free to adjust itself to the shell in the clearance; the loading arrangement is designed not to interfere with the motion of the journal or with observation of pressures in the oil film. In addition, the bearing-loading mechanism contains no knife edges, which makes the machine very sensitive, eliminating all knife-edge friction. With a load capacity of 20,000 lb the accuracy of the large machine is within 0.01 lb. The friction torque may be measured to one part in 20,000. The sensitivity of available commercial machines for the purpose is not sufficient for accurate work. The test journal is driven by a synchronous motor through a multispeed gear transmission. The machine is designed to accommodate large journal bearings, as well as railroad or roller bearings.

Smaller machines of the same general type, without knife edges, are being built for specific laboratory work. A refrigerated room is provided for study of railroad-lubrication or other problems involving bearing operation at low temperatures.

The question of oil flow through a bearing is of great interest. The physicists at the Gulf Laboratory are investigating the question theoretically, and the machine will be used to compare the analysis with experimental data.

C. M. Larson, of the Sinclair Refining Company, New York, N. Y., discussed the physical aspects of present-day lubricating oils, and the difficulties encountered in their manufacturing.

The solvent treatment of lubricating oils by sulphur dioxide has been known for 25 years, but solvent methods came into use for large-scale production only recently. This treatment considerably improved the viscosity index of the resulting products, so that it became possible to use other crudes where Pennsylvania crudes were employed earlier. However, difficulties were encountered in the application of the oils manufactured by the process. An excessive corrosive action appeared at higher temperatures in connection with several special bearing metals. Further chemical treatment, such as addition of sulphur, had to be worked out to overcome this trouble. Difficulties arose in a few instances with sticking piston rings. The cure of these indicated that it was possible to overtreat lubricating oils. It became imperative to add various ingredients to improve the antiwearing characteristics of the oils.

It is now apparent that there is still a lack of information about the real mechanism of lubrication. It becomes necessary once more to revise the basic theories about lubricating qualities of oils. Additional knowledge must be acquired on the essential kinds of ingredients which affect the property commonly designated as oiliness. The solvent process is invaluable as an economical method of oil treatment. Its disadvantages, such as may appear from time to time, will be eliminated by further study and corresponding technical improvements.

Fluid Mechanics Luncheon

We are indebted to Messrs. Hugh L. Dryden and H. S. Bean, of the National Bureau of Standards, for the following account of the discussion at the fluid-mechanics luncheon.

In recognition of the growing importance of fluid mechanics as a basic science of mechanical engineering, a Fluid Mechanics Luncheon was held on Thursday, December 3, under the sponsorship of the Applied Mechanics Division. Many of the sixty persons present participated in a discussion of the status of research and instruction in fluid mechanics in the United States and the relative importance of fluid mechanics as a basic science of mechanical engineering. The discussion was led by J. C. Hunsaker, Massachusetts Institute of Technology; G. W. Lewis, National Advisory Committee for Aeronautics; R. T.

A.S.M.E. MEMBERS AND GUESTS AT THE ANNUAL MEETING DINNER

Knapp, California Institute of Technology; H. N. Eaton, National Bureau of Standards; and M. J. Thompson, University of Michigan.

Professor Hunsaker outlined the experiment which has been made at the Massachusetts Institute of Technology in teaching fluid mechanics as a basic science to engineering students in the junior year. The present course begins with the physical properties of fluids and hydrostatics, progresses through the development of the dynamics of a continuum, laws of similitude, and the dynamics of real fluids to flow measurement, principles of hydraulic machinery, convective heat transfer, lubrication, acoustics, and flow of fluids at and above the velocity of sound. Professor Hunsaker stated that it was still too early to evaluate the success of the experiment.

Dr. Lewis discussed the problems of fluid mechanics in relation to aeronautics. He described and reviewed the work of the laboratories for aerodynamic research in this country and Europe and called attention to the very great expansion of such equipment in Europe in the last few years. He stated that if this country is to keep abreast of the progress of commercial avaiation, we must have laboratories equipped to carry on investigations on a large enough scale to attain Reynolds numbers of 60 to 100 million.

Professor Knapp expressed the view that fluid mechanics should be considered as a basic science of all branches of engineering and that the teaching of this subject should be emphasized more than it is at present in both undergraduate and graduate courses. The course in fluid mechanics should be definitely linked with the course in applied mechanics. Professor Knapp listed the numerous experimental and theoretical investigations in progress at the California Institute of Technology, many of the studies being conducted simultaneously in air and water.

Mr. Eaton recalled von Kármán's analysis of the history of progress in fluid mechanics as divided into a period of "variable constants," a period in which the variable constant was replaced by a function, and the modern period now well under way in which attempts are made to study the fundamentals so that the form of the function may be understood. He presented an analysis of research in fluid mechanics in the hy-

HELD AT THE HOTEL ASTOR ON WEDNESDAY EVENING, DECEMBER 2

PAST-PRESIDENTS J. L. HARRINGTON AND A. A. POTTER AT THE DINNER

draulic laboratories of the United States as shown by National Bureau of Standards Hydraulic Laboratory Bulletin, "Current Hydraulic Laboratory Research in the United States," a bulletin issued every six months by the National Bureau of Standards on the basis of information supplied by the several laboratories. Copies of the last issue of the bulletin and of the analysis were distributed to those present.

Professor Thompson described the organization of a course in fluid mechanics at the University of Michigan. He agreed with other speakers that fluid mechanics should be a required subject for all engineering students and said that such a plan would be put into effect at Michigan with the possible exception of one or two branches of engineering. He described the difficulty of finding a suitable textbook in the English language. (The chairman announced that Professor Thompson and his colleague, Professor Dodge, had attempted to supply this need, and that their book on Fluid Mechanics would be available early in 1937. In later discussion it was mentioned that another book on fluid mechanics by M. P. O'Brien, University of California, and one of his colleagues will soon be ready.)

In the discussion which followed there was substantial agreement that fluid mechanics should be taught as a basic science to all engineers preparatory to more specialized courses, just as applied mechanics is taught preparatory to specialized courses in machine design, power-plant engineering, etc.; that such a course emphasizes in the mind of the student the essential unity of the principles underlying such diverse fields as aeronautics, hydraulics, lubrication, acoustics, convective heat transfer, etc.; and that there is real economy in studying at one time the flow of water, air, oil, steam, refrigerants, and other fluids. There was much attention given to the practical questions of textbooks, hours, content of course, and sources of supply for laboratory and demonstration apparatus. The question of how much knowledge of thermodynamics should be prerequisite to fluid mechanics proved of interest. No summary of this most interesting discussion can be given here.

Many speakers described the difficulty of defining fluid mechanics and of separating the science itself from its numerous applications. The difficulty appeared to be more of formulating a definition in words than any difference of opinion as to the content. All of the speakers emphasized fluid mechanics as that body of knowledge of fluid motion involving a rational method of approach based on general physical laws and consistent with the results of modern experimental study.

Many present were surprised to learn of the large amount of research on fluid mechanics in fields other than their own, the results of which would have a possible application to their problems. The hope was expressed that an information service similar to that found in the National Bureau of Standards Hydraulic Laboratory Bulletin might be made available, and that the Society would find other opportunities to bring together the members of the various divisions, Aeronautic, Hydraulic, Applied Mechanics, Power, etc., who are interested in fluid mechanics.

Engineering Education

The luncheon conference on engineering education was covered by John R. Connelly, of Lehigh University. Mr. Connelly was chairman of the group that handled the conference. His account follows:

A feature of the recent Annual Meeting was a special luncheon conference on engineering education, held on Thursday noon at the Midston House. Approximately 90 people presented themselves for the luncheon, so that a few were compelled to have luncheon in one room and attend the conference in another but they managed to survive the ordeal. Dean Arthur M. Greene, Jr., the presiding officer, although insisting he was a figurehead, contributed materially to the occasion with his skillful introductions.

The three speakers were Willis H. Carrier, chairman of the board, Carrier Corporation; Nevin E. Funk, vice-president of the Philadelphia Electric Co., and Prof. Huber O. Croft, head of the department of mechanical engineering, University of Iowa.

The first speaker, Dr. Carrier, brought out three thoughts of prime importance. First, the emphasis of much of engineering-college work tends to encouragement of memorization by the student to the detriment of stimulation of thinking. Second, the examples of James Watt, Edison, Ford, the Wrights, Kettering, and others, indicate that education is inductive rather than deductive. Unfortunately engineering education now emphasizes deductive rather than inductive thinking. Dr. Carrier attributed this partially at least to the fact that many teachers were mathematical or physical specialists rather than engineers. Third, Dr. Carrier clearly set forth the difference between understanding and skill. He proposed that entrance examinations be divided into two parts. One part concerning understanding only should require a high passing mark such as 80 per cent. Skills such as accuracy and speed should be examined separately and a lower passing mark set at about 60 per cent.

The second speaker, N. E. Funk, suggested that objectives of engineering education could be broadly classified as, (*a*) training the student so that he will be a better citizen and neighbor, and (*b*) furnishing him to the greatest extent possible with the basic tools with which he can follow his chosen occupation. Mr. Funk pointed out the futility of repeating the teaching of the same principles in different engineering courses where the student did not grasp the relation. He further stated that

many mathematics subjects are taught purely as mental exercises and that students are frequently required to study higher mathematics beyond any usefulness to the stndent. He drew an interesting illustration from his own experience showing how the same principles taught differently in separate courses remained as separate ideas until sometime after he had been graduated.

The last speaker, Prof. H. O. Croft, pointed out the gradual change in public high-school graduation requirements in the way of requiring less than would form a foundation for engineering education. He suggested that a national committee might be set up to study the problem thoroughly and suggest a high-school curriculum especially designed for students planning professional careers such as engineering, law, and medicine.

There was considerable informal discussion as the group was breaking up. The talks were all thought-provoking. This conference was under the auspices of a special committee appointed for the purpose, E. W. Burbank, F. V. Larkin, C. F. Scott, and J. R. Connelly, chairman.

Boiler Feedwater

A short account of the Boiler Feedwater session was prepared by J. B. Romer, of the Babcock and Wilcox Company, New York. Mr. Romer, who is secretary of the joint research committee on boiler feedwater studies, writes:

The Boiler Feedwater Session held on Thursday, December 3, showed the continued interest that this subject has for many of those who attend the Annual Meeting.

The session opened with C. H. Fellows presiding. The attendance was close to 150 at the beginning and shortly 226 were present, most of whom stayed until the session adjourned, and many informal discussions lasted for nearly another half hour.

The program called for a paper by Prof. F. G. Straub, of the University of Illinois. Unfortunately, the author, due to circumstances beyond control, found it necessary to withdraw this paper.

W. C. Schroeder then ably presented Progress Report No. 10, entitled "Apparent Correlation Between the Overall Reaction of Solutions on Steel and the Embrittlement of Steel," by A. A. Berk and W. C. Schroeder. This paper represents the results of further research at the New Brunswick Station of the Bureau of Mines by Dr. Schroeder and Mr. Berk. This work at the Bureau of Mines, under the supervision of O. C. Ralston, is sponsored by Subcommittee No. 6, of the Boiler Feedwater Studies Committee, of which J. H. Walker is the chairman.

Before Mr. Fellows opened this paper to general discussion, Mr. Berk presented some data in connection with the failure of one of their test bombs.

Both presentations were illustrated by lantern slides.

That those present were interested in these papers is shown, not only by the fact that nearly every one stayed to the end, but further by the amount of discussion which was evoked.

One written and nine oral discussions were presented. All discussions were good and had a direct bearing on the problem.

The attendance cards indicated that the interest in this subject was coming from many fields, such as railways, public utilities, municipal water supplies, and many types of industry wherein water supplies are important.

The discussers included: F. N. Speller, National Tube Company; E. B. Powell, Stone & Webster Corporation; R. C. Corey, New York Steam Corporation, R. C. Bardwell, Chesapeake & Ohio Railway Company; S. T. Powell, consulting chemical engineer.

PAST-PRESIDENT RALPH E. FLANDERS SNAPPED AT THE DINNER

EXCURSIONS

Under the chairmanship of T. E. Keating excursions to plants and points of interest to engineers were arranged for the benefit of members from out of town. The places visited were: National Broadcasting Co., Rockefeller Center, R.M.S. *Queen Mary*, Hunts Point Coke and Gas Plant of the Consolidated Edison Co. of New York, Model Testing Tank at Stevens Institute of Technology, Pennsylvania Railroad Terminal, American Sugar Refinery, Hayden Planetarium of Museum of Natural History, Ford Motor Co., and Jacob Ruppert Brewing Co.

COLLEGE REUNIONS

Graduates of engineering colleges in accordance with a long-established custom seized the opportunity presented by the meeting in New York to hold "college reunions."

The Columbia University Alumni Association held a dinner on the evening of December 3 at the Columbia University Club.

Cornell alumni attended a dinner at the Waldorf-Astoria Hotel on December 3 in honor of President Livingston Farrand.

The Harvard Engineering Society also met on December 3 at the Harvard Club of New York City with President James B. Conant as guest of honor.

A.S.M.E. members of the University of Michigan met on December 4 at a dinner at the Town Hall Club.

The Purdue Club of New York held its Annual Reunion Dinner at the Building Trades Club. Dean A. A. Potter and W. L. Batt spoke.

C. F. Hirshfeld talked informally to a group of Rensselaer alumni who met for dinner at the Building Trades Club on Thursday evening.

The alumni group of Rose Polytechnic Institute met for dinner at the Advertising Club on December 3.

The Annual Reunion and Smoker of the Stevens Alumni Association was held on December 1 at the Roger Smith Restaurant.

On December 4 at the Railroad Club the Alumni Association of Worcester Polytechnic Institute held its annual dinner.

DINNER TO G. W. LEWIS

Elsewhere in this issue is a complete report of the technical papers and discussions at the Aviation Meeting, sponsored jointly by The American Society of Mechanical Engineers, the Society of Automotive Engineers, and the Institute of the Aeronautical Sciences, which was held on the afternoon of Friday, December 4, in the auditorium of the Engineering Societies Building, New York.

GEORGE W. LEWIS

At the Hotel Biltmore on the evening of the same day the Institute of the Aeronautical Sciences held a dinner in honor of George W. Lewis, member, A.S.M.E., and recipient in 1936 of the Guggenheim Medal "for outstanding success in the direction of aeronautical research and for the development of original equipment and methods."

Seated at the speakers' table with the toastmaster, Harry F. Guggenheim, E. E. Aldrin, member A.S.M.E. and chairman of the Daniel Guggenheim Medal Fund, and the distinguished medalist was a brilliant company of representatives from this country and abroad of the aeronautical industry and the aeronautical departments of many governments. Mr. Guggenheim was introduced by Glenn L. Martin, president of the Institute of the Aeronautical Sciences. Major Aldrin responded to the toast, "The Daniel Guggenheim Medal," after which tributes to Doctor Lewis were voiced by representatives of the War and Navy Departments, the Bureau of Air Commerce, the Weather Bureau, the National Bureau of Standards, the Smithsonian Institution, England, France, Germany, and Italy, the aeronautical industry, and the National Advisory Committee for Aeronautics. The presentation was made by Mr. Guggenheim.

Dr. Lewis was graduated from Cornell University in 1908 with the degree of mechanical engineer and remained at the University as an instructor in engineering until 1910, when he received his master's degree and was elected a member of Sigma Xi. While at Cornell his talent for research and original design received practical application in the development with G. B Upton, of the Upton-Lewis fatigue-testing machine, the commercial manufacture of which was undertaken by the Tinius Olsen Testing Machine Company, Philadelphia.

In 1910 Dr. Lewis became assistant professor of mechanical engineering at Swarthmore College, where he remained until 1917. While there he collaborated with H. C. Hayes in developing a simplified means of determining the elastic limit of tensile-test specimens which resulted in the Lewis-Hayes extensometer.

Under a cooperative arrangement with the Clarke Thomson Research, who engaged Dr. Lewis as engineer in charge in 1917, he was appointed a member of the Committee on Power Plants for Aircraft of the National Advisory Committee for Aeronautics, and prepared for the committee the design of the first experimental Roots-type supercharger for aircraft engines.

After a brief connection as sales manager with the Surface Combustion Company, of Philadelphia, he was appointed executive officer of the National Advisory Committee for Aeronautics in October, 1919. At that time the committee was engaged in the construction of its first wind tunnel and dynamometer laboratory at Langley Field and had just begun to conduct research in flight. Under Lewis' leadership the committee's organization has grown to its present position as a highly efficient research agency operating a research laboratory.

It is largely due to his leadership that efforts were made resulting in the construction of unique and useful items of research equipment. The first of these was the variable-density wind tunnel in which models are tested under pressures up to 20 atmospheres to provide results comparable with those obtained on full-sized airplanes.

The two-foot propeller-research tunnel was the next notable piece of equipment. In this tunnel full-scale propellers can be tested and the drag of aircraft engine cowls and nacelles and airplane fuselages can be measured at full scale. The tank for the testing of models of seaplane floats and flying-boat hulls, and the full-scale wind tunnel, the first of its kind in the world, were next constructed. The newest items of equipment are the free-spinning wind tunnel, and the eight-foot high-speed wind tunnel in which models may be tested at speeds as high as 500 mph.

Dr. Lewis has been vice-chairman of the Committee on Power Plants for Aircraft of the National Advisory Committee for Aeronautics since 1922 and is also vice-chairman of the Committee on Aerodynamics. In 1933 he was designated a Knight of the Order of the Crown of Italy, and in 1934 received the honorary degree of Doctor of Science from Norwich University, Vermont. He has been active in engineering and aeronautical societies, serving as a member of the Council of the Society of Automotive Engineers, and vice-president of the Institute of the Aeronautical Sciences.

PRESIDENT BATT AND HERBERT HOOVER AT THE DINNER

NEXT FIVE YEARS *in* AVIATION[1]

F. K. Teichmann Reports the Aviation Meeting in Connection With the A.S.M.E. Annual Meeting

ABOUT 600 engineers attending the round table discussion on "The Next Five Years in Aviation" heard eight leaders in the field of aviation predict the "things to come" based on present trends and development. The picture presented was very interesting and encouraging. Advances were predicted not only in the probable size of aircraft, but in the design of power plants, in economy of operation, in comfort, in control and stability, and in performance, as well as in increased ocean travel.

The meeting was held under the joint auspices of The American Society of Mechanical Engineers, the Society of Automotive Engineers, and the Institute of the Aeronautical Sciences in the auditorium of the Engineering Societies building, and was under the chairmanship of J. C. Hunsaker, of the Massachusetts Institute of Technology.

Power Plants

In discussing power plants, C. F. Taylor (M.I.T.) restricted his predictions to spark-ignition engines.

On the basis of present mean-effective-pressure values that have already been attained, it would be possible for air-cooled engines to develop well over 1000 hp, a gain of from 20 to 40 per cent in maximum output, and thereby achieve a weight per horsepower well below one pound. The Napier "Dagger" (rated at 725 hp at 3500 ft), having 24 cylinders, would develop 1400 hp if run at higher piston speeds and mean effective pressures.

Investigating the problem from the point of view of geometric similarity, smaller sized cylinders would develop more power than larger sized cylinders. An engine having 1820 cu in. displacement, would develop about 1800 hp if 60 small cylinders could be used. The higher horsepower would tend to decrease the weight per horsepower, although the number and weight of accessories would increase.

Lower fuel consumptions may be confidently expected with the use of higher compression ratios and supercharging. A fuel consumption of at least 0.32 lb per hp-hr is possible within the next five years.

The majority of the engines to be used during the next five years will undoubtedly be air-cooled because of mechanical simplicity both in installation and cooling. However, the air-cooled engines do have the disadvantage of increased drag caused by forcing air through the cooling system, and it is becoming increasingly difficult to extend air cooling beyond the present limits, especially at high altitudes.

It is therefore likely that liquid-cooled engines will be developed—especially for horsepowers beyond 1000—which have the advantage of increasing the cooling surface almost without limit, and without increasing the air resistance.

[1] A round-table discussion sponsored by The American Society of Mechanical Engineers, The Society of Automotive Engineers, and the Institute of the Aeronautical Sciences, held at New York, N. Y., December 4, 1936.

Professor Teichmann who prepared this report is assistant professor of aeronautical engineering at the Daniel Guggenheim School of Aeronautics, New York University, New York, N. Y., and a junior member of the A.S.M.E.

Fuels

Graham Edgar, director of research, Ethyl Gasoline Corporation, agreed in principle with Mr. Taylor, and was even more optimistic. He believes that the specific fuel consumption will be decreased due to the use of fuels of at least 100 octane rating. This fuel is now used at the rate of several million gallons per year, and in the next five years will be as standard as 87 octane rated fuel is at present. Fuels with an "equivalent" octane rating (the basis of comparison for rating still to be established) well above 100, whose composition would consist of blends of gasoline, antiknock agents, and synthetic blends of waste gases of refineries, are now in the research stage.

These new fuels, used possibly with low compression ratio but highly supercharged engines, would increase the horsepower developed per cubic inch and thus help to reduce the weight per horsepower. Fuel consumptions of less than 0.35 to 0.37 lb per hp-hr, instead of the present 0.43 lb for compression ratios ranging from 6 to 6.5, may be confidently expected.

Doctor Edgar pointed out that the British Napier engine, in tests ten years ago, for a compression ratio of 10.5 consumed 0.29 to 0.31 lb per hp-hr at 50 per cent full throttle, and 0.35 lb per hp-hr at full throttle.

To standardize these new fuels the present octane scale is unsuited. Another hydrocarbon for use for rating purposes would be desirable, but so far there has been no success in finding a suitable scale. A supercharged knock-test engine may be developed for this purpose.

When asked at the close of his discourse what would happen at high altitudes with the use of the highly volatile fuels, Doctor Edgar replied that "boiling away" of the fuel in the fuel tank would offer no problem, and could be easily overcome by using higher internal pressures in the tank. Boiling away in the system might be more serious but might be overcome by developing some sort of a fuel-injection system.

Diesel Engines

Doctor Edgar had remarked that in his opinion the Diesel engine would not make any substantial progress over the present carburetor-type engines except, possibly, in the higher horsepower range of 2000 or more, unless the fuel for Diesel engines could be improved.

Mr. Roland Chilton, of the Wright Aeronautical Corporation, concurred in this opinion. He felt that the present spark-ignition engines already had, under actual operating conditions, regularly achieved a fuel consumption of 0.45 lb per hp-hr, with "rich" take-off and cruising so that there was little margin in fuel economy left for the Diesel engines.

The technique of obtaining low fuel consumption on the spark-ignition engines may be complicated, but the development of altitude control has helped, as well as the constant-speed propeller. The cost of fuel is, at present, the primary advantage of the Diesel engine.

Aircraft Size and Performance

Igor Sikorsky startled his audience by claiming that before 1950 it would be possible, with present existing engineering

technique, to build flying boats weighing a million pounds and carrying 1000 passengers; but that the size of aircraft was, unfortunately, limited by considerations of length of route and terrain.

He believes that aircraft weighing between 100,000 and 200,000 lb will have been constructed, or will be under construction, at the end of the next five years.

It is now possible to operate practically over a range of 4500 miles with a payload equivalent of 10 per cent of the gross weight. Present airplanes could carry a greater load except for the fact that the cubical contents of these airplanes limit the amount of useful load that could be carried, and not the weight.

Larger aircraft would have better performance for their weight since the parasite resistance of the airplane varies slightly less than the square of its size, while the weight varies approximately as the cube of the size; the result is that less power would be required for unit size as the total size of the airplane increased.

The general types of aircraft will remain in their respective fields, although the difference in performance would be very small as the size of the craft increases so that the flying boat would approach the land plane, considered at present to be the most efficient type, in performance.

Mr. Sikorsky said that he considered the flying boat better than the landplane for transoceanic travel, not because of possible emergency landing in the ocean but because of its greater cubical content.

In addition to the larger size, the cruising speeds of airplanes on transcontinental and transoceanic lines would be increased from 30 to 50 mph, with a cruising speed of about 200 mph for flying boats and 250 for landplanes.

He did not believe that exceeding these speeds would be practicable. Present aircraft were already three to five times faster than land-surface means of travel and from five to ten times faster than oceanic travel. Greater effort would be made to increase the operating and structural technique, and more attention would also be paid to passenger comfort so that such steadiness would be achieved that even in rough air a glass of water would not be spilled.

The speed increase would be obtained by conventional means. A wing loading of 40 lb per sq ft is possible. Flaps would be used not only for take-off and landing, but for single-engine flight (in case of one engine quitting in a twin-engine design) and for high-altitude flying. The top speed of 525 mph predicted by the N.A.C.A. as the maximum speed attainable could be exceeded, Mr. Sikorsky said.

For the next five years, the normal operating altitudes will be between 20,000 and 25,000 ft. Altitudes of 50,000 to 60,000 ft would be used only by the military services and scientists, and perhaps never by passenger air lines; altitudes of 100,000 ft would never be reached by present heavier-than-air type of craft.

Higher altitudes, of course, permit greater speeds for the power, and better weather conditions are available.

AERODYNAMICS—STABILITY AND CONTROL

Alexander Klemin, director of the Daniel Guggenheim School of Aeronautics, New York University, concurred with Mr. Sikorsky's opinion that larger aircraft would be built. Such large airplanes present problems in stability and control.

At the present time, manual control is aided to some degree by aerodynamic balancing of the control surfaces, but as the size increased, hydraulic control will be necessary, Dr. Klemin claimed. As he pointed out, if the airplane were to increase in size geometrically similar to present prototypes, the wing and tail surface controls would become so enormous that manual control would be impossible, and as the size increased, even hydraulic or other mechanical or electrical means would entail design difficulties. Dr. Klemin said that other means would also have to be used—concentration of weights near the center of gravity to decrease the fuselage length, and perhaps turning accomplished by using engine thrust, in multiengine designs, to help the rudder.

The automatic pilot is not only useful, but also required, and may become even more important in large designs. For as Dr. Klemin explained, present airplanes are designed to be stable although the automatic pilot is used. However, by making the airplane at least neutrally stable, as British aviation authorities already permit, radical changes would be possible in the design of controls and stability with the aid of the automatic pilot.

After the automatic pilot has been used and fully tried to its greatest extent and possibilities in the transport airplane, it would be desirable to develop the automatic pilot for the small private airplane.

The present degree of stability would not be desirable for very large aircraft since they would become so sluggish that it would be difficult to gain altitude quickly or to land in the airport of today. These and reasons previously mentioned necessitated changes in design in large aircraft.

On the subject of two-control operation of airplanes, Dr. Klemin said that he did not believe that this would come about in the next five years. The control surfaces would be improved, and better coordination would be obtained so that two controls might be used at times, but on the whole, the three-control system would be maintained.

AIRPLANE AERODYNAMICS

William Littlewood, chief engineer of American Airlines, Inc., reviewed the present trends in order to arrive at conclusions as to future developments.

Present airplanes have the following features: Low-wing type, with either a retractable or well-faired landing gear; all-metal, internally braced construction; split flap; servo and trimming tabs; retractable lights; improved propellers; and increased horsepower rating of engines; and vacuum pumps replacing outside venturis.

Future developments would be along the lines of feathering propellers; closure of retractable landing-gear wells; removal of external antennas; different windshield design; redesigned carburetors; increase of and improved design of deicers; improved air-speed indicator installations; increase of auxiliary control devices; improved control and stability; adoption of full-span split for Fowler-type flaps with improved lateral-control devices; quicker landing-gear operation; utilization of exhaust heat for blowers, heating, and supercharging; improvement of automatic pilot to reduce time lag; improved oil-cooler installation with probable skin-type development.

AIRCRAFT STRUCTURES

B. C. Boulton, chief engineer of the Glenn L. Martin Company, investigated the weight variation of the airplane, the flying boat in particular, on theoretical grounds and past trends, and came to some interesting conclusions.

Structural weights of aircraft have tended to decrease, he said, due to improved materials, increased knowledge of applied loads, better disposition of load-bearing members, and increased size. The fact that the flying boat uses the body for landing purposes gives it a weight advantage over the landplane since the landing gear is not present.

Assuming that the wing loading varied as the third or fourth

root of the gross weight, and that the wing weight may be determined from the following equation: Wing weight = a constant × load factor × gross weight × span in feet × wing area, he found that the wing weight remained practically at a constant percentage of the gross weight.

The tail surfaces were from 13 to 14 per cent of the wing weight.

The body group tended to decrease with increase in the gross weight; the engine nacelles decreased with increase in size of hull weight, while the hull tended also to decrease in weight with increase in size.

The fixed equipment tended to remain practically constant, varying from about 6 per cent of the gross weight for a 20,000-lb flying boat to $4^1/_2$ to 5 per cent of the gross weight for a flying boat weighing 100,000 lb.

The weight, empty, of the flying boat tended to decrease $1^1/_2$ to 2 per cent with each increase of 10,000 lb in the gross weight.

When asked as to the possibilities of the "geodetic" construction now being publicized in Great Britain, Mr. Boulton stated that it was his belief that it was overrated. Since the stiffness depended upon the modulus of elasticity, the moment of inertia, and the crippling stress, he said that the moment of inertia and section modulus must be less for the same amount of material in the geodetic type of construction than for the skin-stressed type. Moreover, the design was costly due to the multitudinous members, and it was also likely to be heavy due to the type of construction and the empiricism of stress-analysis methods used.

AIRSHIPS

Charles E. Rosendahl, commandant of the Lakehurst, N. J., Naval Air Station, presented a layman's point of view of airship development.

Pointing out that airships were already in use on the continent in Europe and over the Atlantic Ocean, Commander Rosendahl believed that regular travel would be inaugurated within the next five years. While the heavier-than-air craft still had to be developed for transoceanic travel to the point which the airship had already attained, he believed that future developments could only mean greater improvement and comfort in this form of travel.

The airship would not displace any other form of travel—rather it would supplement them.

Airplanes could be used for airship-to-shore service for expediting customs inspection, mail and express delivery, and possibly passengers.

RESUME

It is interesting to note that the eight speakers were agreed that enormous strides would be made in the field of aviation during the next five years, and that the end of advancement and further development is not yet in sight.

In brief, the following points stand out:

(1) Engines will become lighter for the horsepower developed, and probably no great increase in overall dimensions. Air-cooled engines will remain popular but water-cooled engines will be developed for higher horsepower ranges.

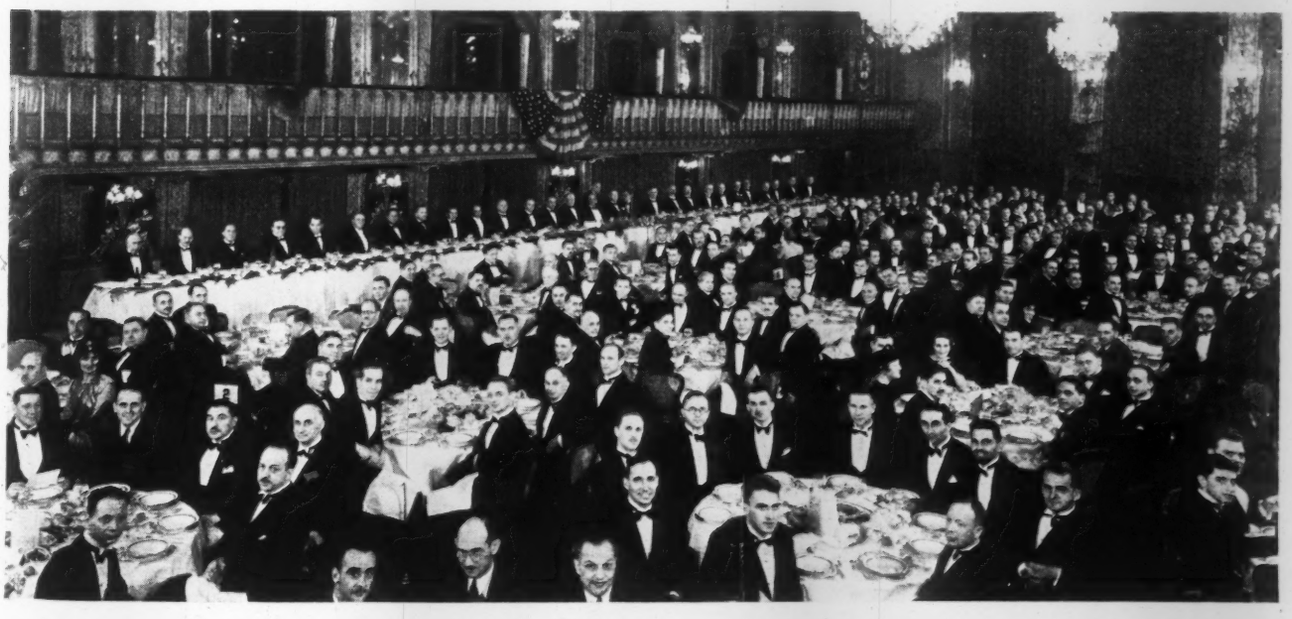
(2) Better fuels will be available, and the specific fuel consumption will continue to decrease, with about a 10 per cent decrease in the specific fuel consumption in the next five years.

(3) Diesel engines will probably be accepted in larger horsepower capacities, but it is doubtful whether this type of engine will replace the spark-ignition type of engine in the aircraft field.

(4) The size and performance of airplanes of all types will continue to increase, limited only by practicability and possible usefulness. Aircraft of two to three times the gross weight of the largest existing types may be confidently expected, and an increase of 20 to 25 per cent in the high speed will probably be attained.

(5) Auxiliary control aids will be required for operating the control systems. The use of the automatic pilot will make a different conception of the stability requirements of an airplane possible so that less inherent stability may be required in the future.

The meeting concluded with the showing of motion pictures of aerodynamic and aircraft structural laboratories of Great Britain, France, Germany, and Italy.



AT THE DINNER OF THE INSTITUTE OF THE AERONAUTICAL SCIENCES, HOTEL BILTMORE, NEW YORK, DECEMBER 4, 1936, G. W. LEWIS WAS AWARDED THE GUGGENHEIM MEDAL

AMBROSE SWASEY HONORED

Presentation of the Hoover Gold Medal at the 1936 Annual Dinner of The American Society of Mechanical Engineers

AMBROSE SWASEY, past-president and honorary member of The American Society of Mechanical Engineers and founder of The Engineering Foundation, was presented the Hoover Gold Medal at a dinner given in his honor at the Hotel Astor, New York, N. Y., December 2, 1936, during the Annual Meeting of The American Society of Mechanical Engineers. Among the distinguished guests was the Honorable Herbert Hoover, honorary member, A.S.M.E., for whom the medal was named and to whom the first award was made in 1930. Mr. Swasey is the second person to receive this award.

Presiding at the dinner as toastmaster was W. L. Batt, president during 1936 of The American Society of Mechanical Engineers. Other members and guests of the Society seated with Mr. Swasey, Mr. Hoover, and Mr. Batt were Gano Dunn, chairman of the Hoover Medal Board of Award, Dr. Harlow Shapley, director of the Harvard Observatory and Thurston Lecturer for 1936, and others who were introduced by President Batt in the following order:

James H. Herron, president-elect of The American Society of Mechanical Engineers.

J. V. W. Reynders, past-president, American Institute of Mining and Metallurgical Engineers, and one of its representatives on the Hoover Medal Board of Award.

Charles T. Main, past-president, A.S.M.E.

E. B. Meyer, past-president of the American Institute of Electrical Engineers and representative of that institute.

H. P. Hammond, president of the Society for the Promotion of Engineering Education.

D. S. Jacobus, past-president, A.S.M.E.

George L. Knight, president of the United Engineering Trustees.

Ralph R. Teetor, president of the Society of Automotive Engineers.

A. A. Potter, past-president, A.S.M.E., and president of the American Engineering Council.

F. M. Farmer, chairman of The Engineering Foundation.

John Lyle Harrington, past-president, A.S.M.E.

Dexter S. Kimball, past-president, A.S.M.E.

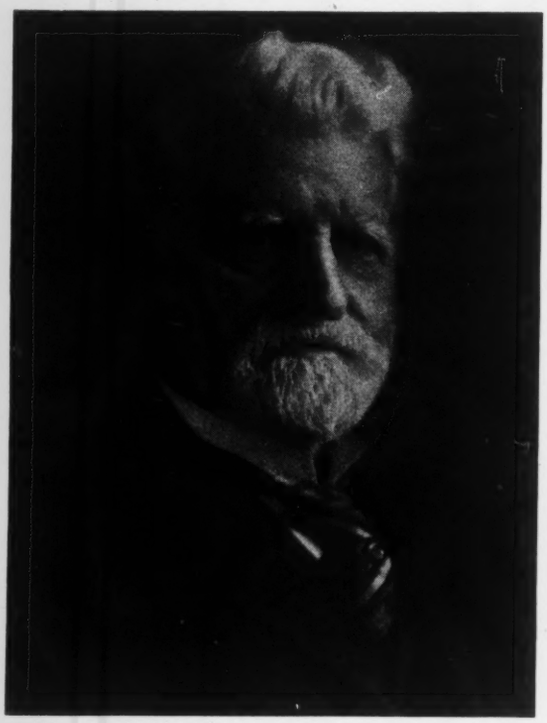
Roy V. Wright, past-president, A.S.M.E.

Conrad N. Lauer, past-president, A.S.M.E., and donor of the Hoover Medal Fund.

Paul Doty, past-president, A.S.M.E.

Ralph E. Flanders, past-president, A.S.M.E.

A facsimile of the cover of the dinner program, bearing the autographs of these distinguished engineers, serves as the frontispiece of this issue.



AMBROSE SWASEY

V.D.I. MEDAL OF HONOR

A letter from Dr. Conrad Matschoss, director of the Verein deutscher Ingenieure, was read by Mr. Batt in which it was announced that, in commemoration of Mr. Swasey's ninetieth birthday (Dec. 19, 1936), the V.D.I. Medal of Honor had been awarded to him. The Medal of Honor, it was explained in the letter, was created at the 75th anniversary of the V.D.I. as a symbol of distinction for outstanding achievements and for the advancement of cooperation between engineers. American engineers to whom this medal has been awarded are the late Calvin W. Rice, former secretary and honorary member, A.S.M.E., and Elihu Thomson, honorary member, A.S.M.E.

Amid the applause of the audience, Mr. Swasey, in accepting the award, expressed the hope that as time went on these great national associations might continue to apply the store of information they had developed for the benefit of mankind

PRESENTATION OF HOOVER MEDAL

The Hoover Gold Medal was instituted to commemorate the civic and humanitarian achievements of Herbert Hoover. The trust fund creating the award is the gift of Conrad N. Lauer, past-president of The American Society of Mechanical Engineers. It is held by that Society and is administered by a board of award consisting of representatives of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. From time to time the medal is awarded by this board to a fellow engineer for distinguished service.

The board which awarded the Hoover Medal to Mr. Swasey consists of the following: Gano Dunn, chairman; Ralph Budd, Albert S. Crane, and Thaddeus Merriman, representing A.S.C.E.; Scott Turner, Clinton H. Crane, and J. V. W. Reynders, representing the A.I.M.E.; Stephen F. Voorhees, Conrad N. Lauer, and William H. Kenerson, representing the A.S.M.E.; and Frank B. Jewett, Gano Dunn, and Howel H. Barnes, Jr., representing the A.I.E.E.

Mr. Dunn, as chairman of the Medal board, delivered the following address.

Address by Gano Dunn

GANO DUNN

WHILE ENGINEERING is old, the profession of engineering is new. It was born about 1750, the child of the industrial era and a very young child it is in the perspective of history that includes those powerful social forces which the professions of the clergy, medicine, and the law represent.

Under the upheavals and attritions of time the latter great professions have more or less found themselves. They have settled into relationships with the life of the community and with the activities of the State that are relatively stable.

Their attitudes toward these relationships are well-defined internally to themselves and well-recognized externally by the public; but this cannot yet be said of the engineering profession.

The engineering profession which arose as a new class about 1750 did not begin to take on its present character until about 1824, when the first engineering schools were established.

From that time on, the phenomenally rapid growth of the profession and its preoccupation with its successive entry into, and in fact its creation of, new regions of industry have so absorbed its capacities and fed its ambitions that only in recent years has it begun to look outwardly upon its relations to the public and to the state, in a way that has long been intimately involved in the practice of the older professions.

This is because the work of the engineer, which used to be regarded as wholly objective and materialistic, which intrinsically it is, has come to affect such a large sector of human life and to depend so vitally upon successful adjustment to human factors that the social-service aspects of the engineer's work increasingly enter into his daily practice.

There have always been in the engineering profession men of high standards who have felt the duty of relating their daily work to the public welfare; but the sense of duty of the profession as a whole to the public welfare is born of a relatively new and developing consciousness among its members.

The creation of the American Engineering Council in Washington by the National Engineering Societies in 1920 to represent them in relation to the affairs of government, is proof of the desire of the profession to play its part as a whole in public affairs. On the other hand, the establishment by The American Society of Mechanical Engineers in 1929 of the Hoover Medal proposed and perpetually endowed by Conrad N. Lauer of Philadelphia, and jointly awarded by a board of representatives of the National Engineering Societies, is proof of the desire to hold up for distinguished honor those individual members of the profession who, by their services to the public outside and beyond their professional duties, set a standard of leadership which all engineers admire and in increasing numbers are resolved to follow.

While the great works of engineers in every field are all directly or indirectly for the public service, it is individual public services that the Hoover Medal was established to recognize; and particularly those individual services rendered extra to the ordinary compensation of engineers, rendered at personal sacrifice and effort, and rendered out of a love for, and devotion to, humanity itself. In this ideal the youngest of the professions desires to emulate the honorable example of the older professions.

To many minds, public service is synonymous with government service; but a moment's consideration will reveal that only a small part of public service is rendered by government, although in these days in the United States the part rendered by government is increasing.

Government public service does not begin to approach in amount the public service rendered by private institutions and agencies. Some of the most active political questions of the day revolve around whether private or government agency best serves the public in certain fields.

As examples of public service by private agencies, we have the great churches and universities, the great insurance companies and banks, and the great utilities such as the railroads, the telephone company, and the electric-light and power companies; in addition we have the great manufacturing industries and the organized mercantile interests.

Opportunities for public service therefore may be through the agencies of government or outside of them.

It was not because Herbert Hoover rose to the great honor of the presidency of the United States, therein rendering public service of the highest order through a government agency, that the founding of the engineers' medal for public service was inspired by his career. It was because his whole engineering activities from the time of his early work in Australia, in India, in China, in Siberia, were characterized by doing more for the welfare of the human beings involved in his enterprises than his technical duties as an engineer or his compensation demanded. The world became aware of his humanity during the great war when, at great personal sacrifice he defended ten millions of people against the threat of starvation by creating and activating the Commission for Relief in Belgium.

Passing over with no more than mention his well-known services as Food Administrator under President Wilson and as Director General of the American Relief Administration; his services under President Coolidge as Chairman of the Mississippi Flood Relief, to say nothing of his particular devotion throughout his whole career to all forms of protection and aid to children, and also passing over with only mention the exceptional public services he rendered to and through the industrial and commercial interests of the nation when he was Secretary of Commerce, we come down to his presidency of the United States with the record of an engineer devoting, whether in or out of the government service, the best efforts of his life to extra professional activities in the interest of human welfare, in other words, to public service.

For reasons which all will appreciate at this time, the acts of his administration as President are not here invoked as instances of the public service of an engineer; but his career since his return to private life has again afforded outstanding evidence of his devotion to the public welfare.

As a private citizen, he has stirred the nation with his contributions to the philosophy of government and with the broad knowledge he has brought to bear in the discussion of recent issues. His devotion to human welfare has again sent him to the front in the rôle of the champion of that personal liberty in support of which our forefathers mutually pledged to each other their lives, their fortunes, and their sacred honor.

On the career of such an exemplar, the Hoover Medal was founded as an instrument in the hands of engineers to single out

THE HOOVER MEDAL AWARDED IN 1936 TO AMBROSE SWASEY

for honor those of their fellows who, like Herbert Hoover, have made signal contributions to the aspirations and ideals for public service which the growing consciousness of the profession recognizes.

There are other very distinguished medals for eminence in engineering achievement itself: The Edison Medal, the John Fritz Medal, the Lamme Medal, the Saunders Medal, the Nichols Medal in chemistry, and still others; but the Hoover Medal, the most recent of them all, is unique in recognizing not engineering accomplishments but public-service accomplishments, by an engineer. It is in a class by itself.

We are here tonight to participate in the ceremony by which the engineering profession sets the seal of its approval on the second of its great figures to represent accomplishment in the realm of its longings to be of service outside and beyond its technical tasks.

From all their number, their representatives constituting the Hoover Medal Board of Award have singled out Ambrose Swasey as worthy to represent their ideals of public service and as worthy to be held up for all time as an example of the type of engineer the Hoover Medal was established to honor.

It is fortunate for the future public understanding of the Hoover Medal that the careers of Hoover and of Swasey are so different, but their difference only causes to stand out in stronger light the characteristics which they have in common, which are the basis for the award of the Medal.

Swasey has never held a government position. As a mechanical engineer, his field kept him near home. He won his spurs in the precision workshop rather than in the wilds of distant climes. His benefits to great masses of people have been indirect rather than direct. Throughout his whole career, however, there has shone in his heart no less than in Herbert Hoover's that love of his fellow man which has been the inspiration of a lifetime of public service outside of his work as an engineer.

The facts of his professional career are given elsewhere. The channels of his public service are also matters of record and they have been so many that only a few can be mentioned here. They have involved the giving of what in the aggregate have been large sums of money earned out of his career, accompanied by the giving of himself to the causes he chose to aid.

Like lights that light other lights without themselves being diminished, these gifts so wisely and discriminatingly given constitute a continuous source of public service that has no end.

As an instance may be cited Ambrose Swasey's creation of The Engineering Foundation in 1914.

The National Engineering Societies beginning with the venerable American Society of Civil Engineers, and successively followed by the American Institute of Mining and Metallurgical Engineers, The American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, constituting what are now known as the Founder Societies, had grown up out of the needs of the profession for personal contacts and the discussion of technical subjects, in fields in which the progress of the art constantly outstripped the books that attempted to follow it.

The constitutions of these organizations were in general oriented toward educational and more or less internal objectives, and did not permit that money received from the dues of members should be diverted to humanitarian or public-service objectives, nor even to objectives involving the broader interests of the profession as a whole as distinguished from the interests of the particular societies.

Made aware by experience of these limitations in the National Societies, and with public service in his mind to and through the engineering profession, Ambrose Swasey gave a large part of his remaining fortune, over three quarters of a million dollars, to the National Engineering Societies collectively for a purpose which his now historic language described as "the furtherance of research in science and engineering or the advancement in any other manner of the profession of engineering or the good of mankind."

In this way there came into being the first public-service institution in the engineering profession. Its funds were placed in the charge of the United Engineering Trustees who hold and administer the other joint property of the National Engineering Societies, and the institution was given the name "The Engineering Foundation."

In the days when it was founded, research was conceived to be one of the chief channels for public service, which it still is and always will be; but such enormous strides have been made in the development of research through university and industrial laboratories whose results are the phenomena of the age, that its need of stimulation is not so great now as it was twenty-two years ago. On this account it is not at all unlikely that

the future will see a shift of the center of interest of The Engineering Foundation in the direction of the other branches of Mr. Swasey's objectives described as the advancement in other ways of the profession of engineering or the good of mankind.

In his insistence upon these other broad objectives as ranking equally with research, Ambrose Swasey's wisdom as well as the quality of his heart is manifest.

Throughout the past two score years the accomplishments of The Engineering Foundation alone constitute a catalog of public service that, even if there were nothing else, validates the claim of the name of Ambrose Swasey to the gratitude and honor of the engineering profession.

Not the least of the accomplishments of The Engineering Foundation is the support that enabled the success of the National Research Council in its early years and was an important factor in obtaining its five-million-dollar endowment.

While we are not concerned tonight with the honors Swasey's technical accomplishments have brought him, mention of some of them is in order if for no other reason than to prove that he belongs to us.

He is a past-president and honorary member of The American Society of Mechanical Engineers and of the Cleveland Engineering Society; an honorary member of the American Society of Civil Engineers. He is also one of the 291 members of the National Academy of Sciences and a member of the American Philosophical Society. He is an honorary member of the British Institution of Mechanical Engineers and of the British Institution of Mining Engineers, also of the Society of Civil Engineers of France. He is a fellow of the Royal Astronomical Society of London and has received the John Fritz Medal for engineering achievement. But these are not his titles to the unique medal of tonight. The title to that is in his heart.

His years are many, but he is rich in the spirit of youth. This spirit constitutes an example to his fellows who hold him in personal affection no less high than they hold him in honor. It is not an accident that he has long been known as "The Knight of the Kindly Heart."

To make this evening's honor greater yet there has come to be present with us and join in the acknowledgment of the award no less a person than the Medal's own exemplar, Herbert Hoover.

Therefore, Mr. Swasey, in the presence of this distinguished jury of your peers, with their unanimous affection and acclaim, and with a sense that we are honoring ourselves by honoring you, I now present to you on behalf of the National Engineering Societies and in the presence of Herbert Hoover the Hoover Medal on which the legend reads "awarded by engineers to a fellow engineer for distinguished public service."

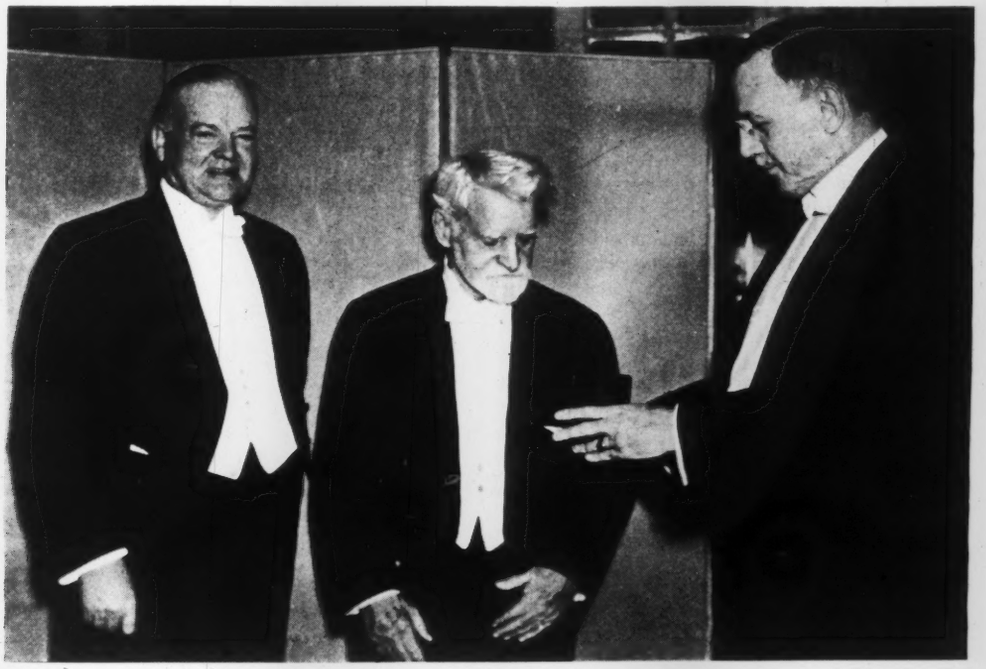
INTRODUCTION OF HERBERT HOOVER

It was the good fortune of the Society and of the Hoover Medal Board of Award that Mr. Hoover himself was present at the dinner and consented to make an address in honor of Mr. Swasey.

In presenting Mr. Hoover to the attentive audience Mr. Batt said:

> Mr. Hoover is a past-president of the American Engineering Council. He is a past-president of the American Institute of Mining and Metallurgical Engineers. He is an honorary member of at least six great national engineering societies. He has received almost if not quite every engineering award and recognition which the world affords. He has, I think, some thirty-six honorary degrees. In fact, one can hardly look at the roster of the honors of the world which can come to any single man, and see any which have not come to this man who is to speak to you.
>
> In the excitement and the confusion of today we must not forget that this man has characteristics which will go down in history—characteristics which sometimes we are likely to overlook. Can we forget the fact that he has fed men? Can we overlook that big-heartedness of his for men in trouble? Can we ever forget, in the excitement of the day, the quiet devotion which he has for a life-time demonstrated for world peace?

Mr. Hoover was received with sustained and enthusiastic applause which he acknowledged whimsically by commenting that inasmuch as the addresses were not being broadcast the applause cost nothing. His address follows:



THE DINNER: HERBERT HOOVER, AMBROSE SWASEY, AND GANO DUNN

Address by Herbert Hoover

HERBERT HOOVER

THIS OCCASION is for us an opportunity to express our appreciation and our devotion and esteem to Dr. Swasey, and I would like to say something about Dr. Swasey also, because I do not feel that Mr. Dunn has done an entirely adequate job in that direction, although he rather overdid it in my direction.

Ambrose Swasey—Engineer—now in his ninetieth year, and all of them except the first twenty have been devoted to engineering problems and to public service. He may have begun before that, but seventy years are enough to entitle him to this medal.

In each of these years Dr. Swasey has produced some definitely productive tool, some definite new idea that has been spun into the fabric of the industrial and scientific life of our nation. Some day some one will write an ode to the deeds of the great toolmakers. Without them scientific research could not fructify and industry could not even start. The sum of Dr. Swasey's contributions have brought more comfort to the homes of America and more security to the lives of Americans than any one of our great philanthropists, and he has not neglected the field of philanthropy, as we, the engineers, well know.

The world probably still generally believes, at least it did until recently, that invention is the product of some genius in a garret, but we know, as engineers, that invention does not spring full grown from the brains of any man. Invention is the result of patient research, of long experiment, and of minute improvement in the building of tools as well as in the product. Every tool and every machine that Dr. Swasey has designed was a little better adapted to some new purpose; but there is very little drama about the tool.

This medal was especially dedicated to engineers that have carried the engineering banner of intellectual honesty and engineering devotion into public service. Mr. Swasey was doing his part in performing those functions when we were boys.

In a larger sense, our nation and the whole world today is passing great tests. Most of us believe that our social system must be maintained in its vital and essential principles if human progress is to continue. But many of the economic and social problems which confront us today are indeed the problems created by engineers themselves.

And these repercussions must now come into the field of the engineer. With the general rise of engineers to executive positions, with the possibilities of engineers in clarity of thinking and planning, they can be of great public service. Many of these problems lie outside of government. They must find their solution through industrial and engineering action. We not only have the new problems of human relationship which the expansion of mass production and industry have brought upon us, but we have problems of industrial statesmanship in the policies of these enterprises. They may involve the fate of civilization if we fail to find their solution. They are problems that can be solved only by the processes of engineers—the painstaking collection of fact, experimentation, the determination of proportional weight of facts and experiences, and, above all, intellectual honesty.

The engineer can no longer hold himself to mere design of plan or of administration, but must range out into the fields of sociology and economics. For instance, one incident of these problems is worth brief mention. We have gone on making labor-saving devices. For a century engineers have been called upon to defend these labor-saving devices against the charge that they produce unemployment and human misery. We have at this moment probably a larger proportion of technological unemployment than ever before. I scarcely need to state the economic answer to this charge. New inventions and new articles increase new wants. They increase the standard of living and of employment. Our improvements in the production of older articles of consumption are cheapening these costs, should decrease the price to the consumer, and thus expand the consumption and thereby also increase the standards of living and increase employment. That is sound economics, but it depends both on the time element and the reduction of the price of goods to the consumer.

If increased wages and profits are to absorb the savings which the engineer produces through labor-saving devices and new methods and there is not a reduction of price which is essential to increasing consumption, we shall give no relief to technological unemployment. Incidentally, increasing prices merely because there is rising demand defeats the very end which statesmanship requires in our industries at this time.

This is no place for an elaboration of this economic theme, but I am convinced that when we fully understand the economic history of the period of the 'twenties, we shall find that the debacle which terminated a highly prosperous era was considerably contributed to by a failure of industry to pass its improvements on to the consumer. They went too largely to the people engaged in production industries and neglected the interest of the farmers and those engaged in the service industries. Consumption did not expand as it should have done. That participated with the misuse of credit in the production of the depression of 1929 to 1936. I leave it to you to consider if we are not again reproducing this same cycle. This is but a sample of the problems of public relations which lie peculiarly in the responsibility of engineers.

But this is no time to pursue economic themes. That is perhaps afield from the subject. We are here to express our appreciation and esteem of Dr. Swasey. He has made great contributions to our profession. He receives this medal not at the end of a great service; he has received many such distinctions before, and this one, like all the others, is but a milestone in Dr. Swasey's life.

INTRODUCTION OF DR. SHAPLEY

Following Mr. Hoover's address, Mr. Batt introduced Dr. Harlow Shapley, director of the Harvard Observatory, as the Thurston Lecturer for 1936. Mr. Batt explained that this lectureship had been established by the Society in honor of its past-president, Robert Henry Thurston, and its purpose was to provide on the program of the Society's Annual Meeting a speaker who might discuss some subject in the vague zone between science and engineering. Inasmuch as Mr. Swasey had contributed greatly to both science and engineering, the Thurston lecture had been made a feature of the Swasey dinner, and an astronomer had been asked to deliver it.

Dr. Shapley's subject, "Ninety Years of Stellar Exploration," was treated by him in a lightly humorous vein which fascinated and amused his audience and brought to a delightful close the after-dinner speeches. A major portion of the address follows:

Address by Harlow Shapley

HARLOW SHAPLEY

WHEN AMBROSE SWASEY was born, December 19, 1846, Venus was in Sagittarius and Mars some ninety degrees away was in Libra. It was obvious that those aspects of neighboring planets foretold exactly what we witness tonight—beautiful Venus-like women, and martial-like men who stand bravely by through a barrage of after-dinner speaking. Obviously this is not a time to speak on ninety years of stellar exploration, but to cast Mr. Swasey's horoscope. That I propose to do.

Looking into this horoscope I see that the aspects of the heavens were the same for Lillian Russel, for Mrs. Fiske, and for Miss Dotty Dimple, born Hennessey, of the local Follies. All were born under the same sign; and we shall never have a better chance to illustrate the infallibility of astrology than to point out the parallelism of their lives and careers.

As I look back in the ephemeris of 1846 I find that the Georgian was in the Fish, that is Uranus was in the constellation Pisces. The planet Uranus was discovered toward the end of the eighteenth century by Sir William Herschel, an amateur astronomer and organ player. He thought it was a comet. Later somebody showed that it was a major planet—one of the great discoveries of the century, and Herschel named it for that illustrious prince, George the Third, "The Georgian," and the Georgian it was called for a considerable time by the British.

In the fall of 1846, Neptune, then called Leverrier's planet, was discovered. The publication of the discovery of this particular planet was made in this country in December, 1846. It was an epochal era for astronomy in more ways than one. Within a month after the planet itself was first seen William Lassell discovered a moon for Neptune. This satellite remains unnamed to this day and, if it were not for fear of spoiling our medalist, I would propose that we name it Ambrosia, or Swasey. To do so may turn his head; but it is so named.

I do not suppose the Swasey family knew about it, but in 1846 there was noted a maximum of sunspots. It was a year of maximum disturbances on the sun. Something just had to happen. For several years, a German astronomer, Heinrich Schwabe, had been saying that the appearance of sunspots followed a period of about ten years. Nobody paid any attention to him. In 1844 and 1845, he noted a minimum and finally in 1846, a maximum of solar activity. By December 19 the static on the radio caused by sunspots must, no doubt, have been very serious, had the Swasey family listened in at that time. Von Humboldt, a year or two later, noticed that the sunspots' period must be something of importance and called attention to it in his "Kosmos." This was at the beginning of the study of solar periodicity and also of economic periodicity which certain persons like to attribute to the sunspots.

The art of photographing the skies was unknown in 1846, but by 1850, it had begun; in fact, things began to move immediately after December 19, 1846. The Harvard Observatory was finished the next year and almost at once several rather important discoveries were made. The dusky ring of Saturn was discovered by Lassell, who also found two moons of Uranus and one moon of Neptune, but in the process of doing so he showed that four of the moons which were previously announced for Uranus did not exist and so his net loss was one moon.

As I have indicated, almost all the activity at that time in the field of astronomy dealt with the solar system—discovering moons, rotation periods, the distance to the sun, and the weight of the earth, and in devising instruments for the accurate determination of time. Little was done with stars. They were used largely for the determination of time. Little was known of the nebulae except that the Herschels commenced to catalog them without a very clear understanding of what it was all about. Soon after 1850 photographic methods were developed, and Sir William Huggins began work in spectroscopy—analyzing the chemistry of stars. Two new sciences were born in the next two decades through these engineering scientific developments: One was astrophysics, a study of the spectra of stars and the sun, and of the chemistry of the universe; and the other was astrophotography which has permitted us to study millions of stars in a great synthesis and to use statistical methods in the analysis of the structure of the universe.

Neither of these methods of astronomical research was known in the forties. Both developed more or less rapidly after 1850. I could pick out other types of studies that have developed entirely since that time and that have an engineering touch, as for example, the development in recent years of photoelectric devices, for the electrical engineer has now become of great importance to the astronomer.

The study of radio waves that seem to come from the Milky Way could not have been imagined in 1846. The study of the spectra of the stars has led to an understanding of stars streaming with the rotation of the galaxy, of the motions of local clusters, of the general distribution of cosmic speeds, and of cosmic momentum.

A great deal of the work on the spectra of stars has been done with the great American telescopes, and the great American telescopes have come to us because Warner and Swasey, J. A. Brashear, and Alvan Clark were engineers who turned their minds to the problems of large mountings, lenses, and mirrors. We could not have made such advances during the past 40 years without the aid of these pioneering engineers. If I were to go into detail about these studies I would be continually mentioning instruments that Mr. Swasey himself has helped to build.

Another group of researches in recent years that are worthy of mention deal with the expansion of our knowledge of our own local solar system. Numerous studies were made before 1846, but since that time we have perhaps almost doubled our knowledge of the solar system. We have greatly increased it at times, and have had to discount some advances later. There is a large overturn in the theories of the origin of the solar system, and, if you want my professional opinion, at the present time we do not know just how we came about. Personally, I am not very much interested, because astronomy has moved away to a great extent from the solar system and planetary phenomena.

We now feel that our job in contributing to the understanding of the whole world is to get outside where the stars are, where the great energy-distribution problems lie, into the questions of the Galaxy and external galaxies. External galaxies were not known, except in vague dream, ninety years ago. Now we have studied them until we have reached millions of light years

into space. We find velocities of tens of thousands of miles a second in a universe that apparently is expanding at enormous speed. And in the vast inter-stellar spaces we have come upon problems that are going to demand much more of astronomy and of engineering.

Within the past few weeks we have announced from our observatory a discovery made at the Mount Wilson Observatory. It pertains to an analysis that reveals titanium out in the space between the stars—inter-stellar titanium gas. This is a new and important development. I suppose some of you are interested in titanium. Inter-stellar titanium is hardly yet on a productive basis. I have just calculated that there is about one gram per million trillion cubic miles.

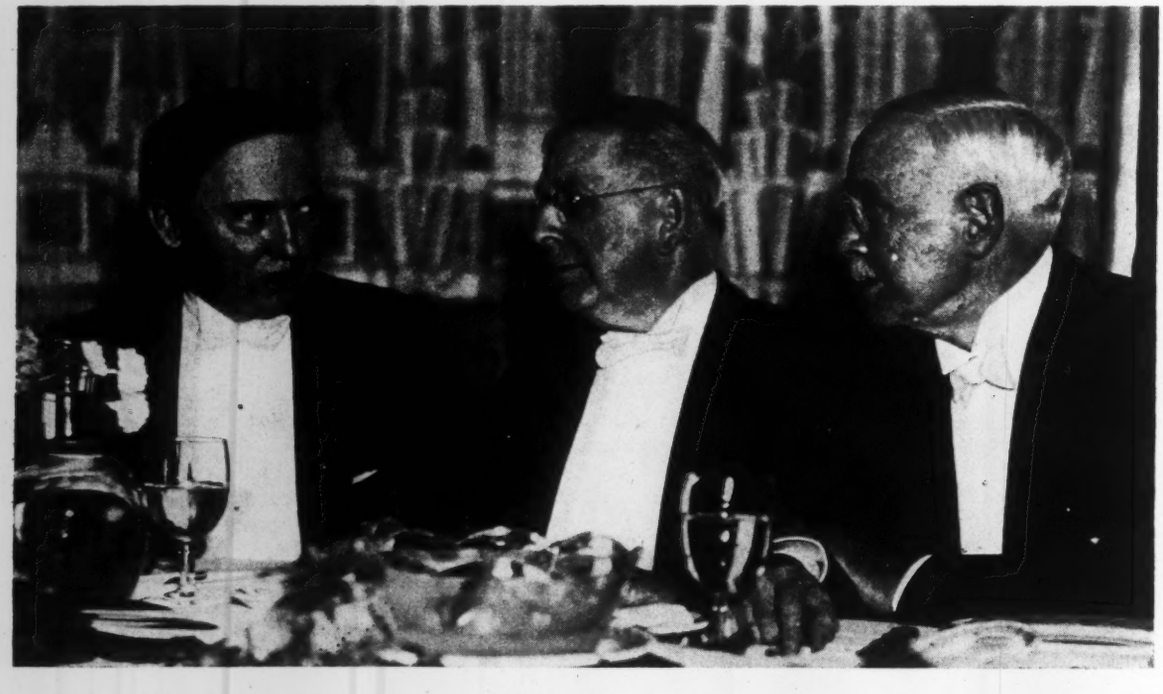
Later, we expect to find other substances in inter-stellar space. Calcium and sodium have long been known to pervade space. This new inter-stellar knowledge we obtained through developments in the engines that rule gratings, and through engineering developments that permit us to aluminize the great mirrors of astronomical instruments. We used to say that one must study deep mathematics to understand astronomy and do work in it, but now we say, "Don't bother about mathematics, let us incite the engineer into providing more gadgets and then we shall short-cut many of the obstacles that have bothered us."

Returning to the solar system we not only have found that our older theories are not true, but we have discovered new objects. Only a few of the asteroids were known in 1846. Now we know more than a thousand of these little bodies that move between the orbits of Mars and Jupiter. They are much perturbed by the planets. In fact, the planets long ago set up this American Policy of Interdependence, and we cannot follow the motion of one without seeing what the sun and all the neighboring planets are doing to that particular body. At the present time, there is a little body known as Apollo, recently named. It is one of the small asteroids and goes way out beyond the orbit of Mars, comes past the Earth, goes to the orbit of Venus, and out again into a comet-like orbit, but with a planet-like aspect otherwise. It has been seen but once for a few weeks.

For many months two of the men at the Harvard Observatory have been computing the position and perturbations of this particular little body, and during the next few months a desperate search will be made in the hope of rediscovering the object and following its motions. We now know that if we can follow its motions, we have in it a tool that will help us to get a better knowledge of our own solar system and give us a more accurate determination of the distance to the sun and of the mass of the moon.

Perhaps it would be a good idea in conclusion to draw a moral from the stars because, in our concern for Mr. Swasey, we certainly should try to give him some good advice. The moral, if I may be pardoned, could be this: "In engineering practice, it is perhaps better for you to remain conservative like planetary motions and careful if you are going to hold your job, but in interpretations it is uncautious thought that will make possible the greatest advance." I suspect that back of your engineering career there have been a great many nonorthodox thoughts. But your telescope mountings are all standing and working.

Sometime Mr. Swasey may thank us for this kind advice. Perhaps not. But certainly we can all thank him for a long lifetime of persistent inspiration.



DR. HARLOW SHAPLEY, THURSTON LECTURER FOR 1936; JAMES H. HERRON, PRESIDENT-ELECT OF THE A.S.M.E. FOR 1937; AND J. V. W. REYNDERS, PAST-PRESIDENT OF THE A.I.M.E., AND A REPRESENTATIVE ON THE HOOVER MEDAL BOARD OF AWARD. PHOTOGRAPH TAKEN AT THE DINNER

SOVIET MONEY *and* FINANCE

By OLIN INGRAHAM

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

ECONOMISTS for a long time have wondered how money and finance would operate under an actual socialism. It is easy enough to solve such problems for an imaginary socialistic system. For that matter, it is easy enough to solve such problems for an imaginary competitive business system. But a great deal of our difficulties between 1929 and 1932 were that those imaginary conditions were far from the facts. Likewise the evolution of money and finance in Russia was not according to a socialist plan but developed from a series of compelled decisions made under the pressure of special circumstances. This book shows us the evolution up to the beginning of 1936. We can guess that the future evolution will have in it much also of compelled decisions and special circumstances.

The author of "Soviet Money and Finance," L. E. Hubbard,[1] is of an English family which for a century had been in the business of exporting goods from Russia. He, of course, cannot continue in his family's business, as international trade is now a governmental monopoly, but as an outsider his interests have been sublimated. He has become the expounder and the somewhat caustic critic of the Russia that he cannot do business with. Though caustic, I think he is honest; but no matter how honest, it is difficult to be truthful about the economic data of a country where the choice is between unchecked official statistics, frequently inadequate to the subject at hand, and loose random information which of course cannot cover the field. For instance, Hubbard is interested in what sort of price changes have resulted from this money-finance evolution. But the land of workmen has no indexes for retail prices and the cost of living.

Hampered as he is, the author makes as good a job of it as he can. There sweeps before us the panorama of early Soviet victories under an almost nonexistent money-finance system. For the city workmen there were ration cards giving them scanty rights to consumer goods if such were available. (Nineteen years have passed and only with the beginning of 1936 have the last vestiges of these ration cards disappeared.) The victorious socialists found themselves confronting counter-revolutions and famines without as yet having mastered the art of industrial efficiency. All over the countryside went up growling complaints as the peasants were forced to exchange perfectly good food for microscopic amounts of industrial products. Then came the "strategic retreat" of Lenin, which most of us expected to be permanent, when foreign business was solicited and domestic business permitted. For such a condition some sort of reliable money, some sort of banking was necessary. And this retreat is of importance because the system created then has continued in modified form to the present. It was a system of a gold standard for international purchases, sales, and debts, and a domestic paper money which could vary relatively to gold but should not be allowed to get wildly out of hand. That these two separate systems could continue side by side was made possible by the government monopoly of international trade. As to banking, a system something like that of the French, a system of national banks of specialized functions, was created, only of course these banks were nationally owned.

The "strategic retreat" lasted only for a few years. The disgust of the socialists over the orgies of the new "profiteers," the growing efficiency of the socialized "trusts" caused again a forward and more substantial movement toward complete socialism. The new private business was "liquidated," the government went forward with its five-year plans. Outwardly those plans first took the form of massive construction for producer goods, then the socializing of the farms. And at present their most difficult problem is the creation of a reasonably adequate stream of consumer goods. This book deals not with the physical show of things, but we simply add the comment that if the physical show had not been as dramatic, if there had not been put visibly before Russia the new hydro-electric plants and steel cities, it might have been far more difficult to carry on the finances of the transformation. Hubbard shows in one of his tables that as late as 1925–1926 the percentage of national income included in the government budget was less than in 1913. Then in the next four years the percentage doubles, and by 1934 has doubled again. Socialism in operation, a socialism that is pervasive over most of the economic life of Russia, is a matter of only the last ten years in regard to city industries; of only the last five years in regard to agriculture.

Well, behind all this, if there is not to be hopeless confusion, there must exist a great national budget. This budget must be carried into effect by a system of banking. To describe how this is done is the main task of this book. One is given first the scheme of industrial administration, which at the bottom is the single enterprise, at the top either the People's Commissariat for Heavy Industry, or the People's Commissariat for Light Industry. In the case of great projects there are no intervening stages. In the smaller projects there are "trusts" and sometimes combines of trusts. Various attempts have been made to solve the problem of sufficient but not too great centralization, but of course with no perfect results.

So extend the lines of authority from Moscow to the far-flung individual enterprises. Then this great system, some way solving the claims of industry on industry, the demands from Moscow and the counterdemands of individual enterprises, draws up the schedules of the five-year plans, of course plans that while they look forward five years, will not be accomplished by some concerns, will be surpassed by others; will require, therefore, continuous control to make the discrepancies as small as possible, but continuous revision to adjust the plan to these discrepancies.

Controlling the physical plan is the financial plan. Laborers must be paid wages. Socialist enterprises must buy and sell from each other, there must be outlays, there must be credit, there must be an accounting valuation of inventories. If there is to be control, all the values involved must be determined. Each single enterprise must have its limited right to spend on current operations and on expansions. Likewise it must have an obligation to sell anticipated amounts of value which

[1] "Soviet Money and Finance," by L. E. Hubbard, Macmillan & Company, London, 1936, 339 pp., $4.50.

One of a series of reviews of current economic literature affecting engineering prepared by members of the department of economics and social science, Massachusetts Institute of Technology, at the request of the Management Division of THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

will give it counterbalancing money and credit. But Hubbard does not need to tell us that the actual costs will vary, and vary upward from the anticipated, that there will be delays in production and therefore delays in counterbalancing money and credits. Nor need Hubbard tell us that worried heads of enterprises, inadequately trained in accounting, may allow or encourage their accounts to fall into hopeless confusion. Apparently quite a little of the budgetary appropriations were transformed in their actual expenditures.

The financial circulatory system runs through the banks. For current receipts and expenditures there is the Gosbank with its 2400 branches. Every enterprise is, of course, a depositer in its branch bank. From it, it will receive its current money to pay wages; to it will be added credit from any sales it makes to any other enterprises. The prices at which it sells goods equals the calculated total cost including the heavy cost of the turnover tax. At first the machinery of the transfer of credit started with the buyer's branch bank, but credit accounts moved too slowly and irregularly. The seller's accounts were at the mercy of this slowness and irregularity so the transfer of credits now starts at the seller's end.

Then there are, besides the Gosbank, the specialized investment banks with their branches. We cannot here touch on many of the important phases of industrial finance which Hubbard discusses.

Meanwhile, the great mass of the people are still on the farm. But whereas ten years ago farming was individual, now three quarters of farm land is in collective farms. These collective farms are not themselves tightly organized in the national socialist system, they are, rather, producer cooperatives, leasing tractors and other equipment from the state and giving the state a part of their produce at a price far below the price at which the state, in turn, sells the produce. Hubbard says that the peasantry is exploited by the government, giving as proof the much lower money income of the farmer compared with the city workman, but such differences occur in other parts of the world where there is no government exploitation. It will be interesting to see whether the constitution about to be adopted which equalizes the voting power of the peasant to that of the city workman, will improve his relative status. Up to the present the voting power per peasant has been about one fifth that of the city workman.

Finally, in the book, we reach the city consumer. All these great projects of industrial expansion, of modernization of highways and railroads, of motorization of farms, of wiping out illiteracy, of building a great army, must be paid for, have not been paid for by borrowing, have chiefly been paid for by the bookkeeping device of the turnover tax, which becomes a real tax in the form of prices of goods sold to the public at figures way above their factory and farm costs. Even so, the amount paid out so far to the public in wages for all services has been greater than the gross value of consumer goods sold by the state, resulting in the continuation up to this year of some vestiges of ration cards, limiting the amount that anyone could purchase, and also, of course, as there was this surplus paper money, creating other markets, some legal and some illegal, where at extravagant prices the remaining purchasing power could be spent. One evil result of selling less total value than the purchasing power of consumers was the absence of consumer control. The government could charge arbitrarily, the government could hand out indifferent quality of goods and yet be sure to sell all its stock. In the last two or three years these ration cards have covered fewer and fewer items, until this year, 1936, they have been entirely abolished. The government attributes this to the increase in the stream of consumer goods and publishes an index of consumer-goods production which is now running more than twice as high as it was in 1929. Hubbard insists that this balancing has been largely achieved by raising prices by a greater ratio than the rise of wages. If we may trust newspaper correspondents, the situation is more favorable than Hubbard suggests and less glowing than government statistics would indicate. Anyway, the balancing of consumer purchasing power by gross value of consumer goods means that Soviet stores, like other stores, may have to face the problem of undesired, unsold goods, by improving the management of the stores and making more exacting the demands upon the factories.

So Hubbard was fortunate enough amid all these books that have been published in English on Soviet Russia, to write his on a phase almost untouched, yet a phase absolutely essential to any great nationalistic socialism. Add to this that the book is a good piece of workmanship and it becomes one of the few that are essential to our understanding of Russian socialism in operation.

Young and Phelps

A.S.M.E. BOILER CODE

Interpretations

THE BOILER Code Committee meets monthly for the purpose of considering communicatons relative to the Boiler Code. Any one desiring information on the application of the Code is requested to communicate with the Secretary of the Committee, 29 West 39th St., New York.

The procedure of the Committee in handling the cases is as follows: All inquiries must be in written form before they are accepted for consideration. Copies are sent by the Secretary of the Committee to all of the members of the Committee. The interpretation, in the form of a reply, is then prepared by the Committee and passed upon at a regular meeting of the Committee. This interpretation is later submitted to the Council of The American Society of Mechanical Engineers for approval, after which it is issued to the inquirer and published in MECHANICAL ENGINEERING.

Following are records of the interpretations of this Committee formulated at the meeting of October 16, 1936, and approved by the Council.

CASE NO. 833

(In the hands of the Committee)

CASE NO. 834

(In the hands of the Committee)

CASE NO. 835

(*Interpretation of Pars. P-268 and U-59*)

Inquiry: In welding an inserted type

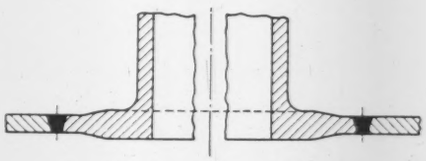


FIG. 34 INSERTED TYPE NOZZLE

nozzle as shown in Fig. 34, should the joint be radiographed?

Reply: Whereas Figs. P-6 and U-6 show some types of acceptable nozzles which need not be X-rayed under Pars. P-268 and U-59, it is the opinion of the Committee that when an inserted type nozzle as is shown in Fig. 34 is used, the welded joint shall be radiographed.

Revisions to the Boiler Construction Code

IT IS THE policy of the Boiler Code Committee to receive and consider as promptly as possible any desired revision of the Rules and its Codes. Any suggestions for revisions or modifications that are approved by the Committee will be recommended for addenda to the Code, to be included later in the proper place in the Code.

The following proposed revision has been approved for publication as proposed addenda to the Code. It is published below with the corresponding table number to identify its locations in the Code, and is submitted for criticism and approval from any one interested therein. It is to be noted that a proposed revision of the Code should not be considered final until formally adopted by the Council of the Society and issued as pink-colored addenda sheets. Added words are printed in SMALL CAPITALS; words to be deleted are enclosed in brackets [ ]. Communications should be addressed to the Secretary of the Boiler Code Committee, 29 West 39th St., New York, N. Y., in order that they may be presented to the Committee for consideration.

(*Continued on page 48*)

TABLE P-2: Revise to read:

TABLE P-2 MAXIMUM ALLOWABLE WORKING PRESSURES FOR SEAMLESS STEEL TUBES FOR WATER-TUBE BOILERS

(For metal temperature not over 700 F)

THICKNESSES OF TUBE WALLS IN BWG AND INCHES (Based on maximum allowable stress of 9000 lb per sq in.)

O.D. INCHES	20 .035	19 .042	18 .049	17 .058	16 .065	15 .072	14 .083	13 .095	12 .109	11 .120	10 .134	9 .148	8 .165	7 .180	6 .203	.220	.240	.260	.280	.300	.320	.340	.360	.380	.400	.420	.440	.460	.480	.500
1/2	970	1260	1550	1920	2310																								
3/4		880	870	1120	1310	1510	1810	2140																					
1				720	860	1010	1240	1480	1770	2000																			
1-1/8				590	710	840	1050	1270	1520	1730	1990	2240																	
1-1/4					590	710	890	1090	1320	1510	1740	1970	2250																
1-1/2						510	660	830	1020	1170	1370	1560	1800	2000															
1-3/4							500	640	810	940	1100	1270	1470	1650	1920	2120													
2							380	500	650	760	910	1050	1230	1380	1670	1800	2000												
2-1/4								390	520	620	750	880	1040	1170	1390	1540	1730	1910	2090									
2-1/2								310	420	510	630	740	880	1010	1200	1340	1510	1670	1840	2000									
2-3/4								230	340	420	530	630	760	870	1050	1170	1320	1480	1630	1780	1930	2080							
3									270	350	440	540	660	760	920	1040	1170	1310	1450	1590	1730	1860	2000						
3-1/4										280	370	460	570	660	810	920	1050	1170	1300	1430	1560	1680	1810	1940	2070				
3-1/2										230	310	390	490	580	720	820	940	1060	1170	1290	1410	1530	1650	1770	1880	2000			
3-3/4											260	340	430	510	640	730	840	950	1050	1170	1280	1400	1510	1620	1730	1840	1950	2060	
4											210	280	370	450	570	660	760	860	970	1070	1170	1280	1380	1480	1590	1690	1800	1900	2000
4-1/2												200	280	350	450	530	620	710	810	900	990	1080	1170	1270	1360	1450	1540	1630	1730	1820
5												130	200	260	360	430	510	590	680	760	840	930	1010	1090	1170	1260	1340	1420	1510	1590

$$P/S = 2.3\ t/D - 0.054$$

where P = maximum allowable working pressure, lb per sq in.; S = maximum allowable stress, lb per sq in.; D = outside diameter, in.; t = thickness of tube wall, in. For $S = 9000$; $P = 20{,}700\ t/D - 486$.

(1) No tubes shall be used in boilers of a lesser thickness than given in the table.

(2) For pressures higher than given in the table the allowable working pressures shall be the next higher units of ten above the values given by the formula.

(3) Seamless and lap-welded tubes shall conform to Specifications S-17 of the Code, Grades A and B, and electric-resistance welded tubes shall conform to Specifications S-32.

(4) The maximum allowable working pressures for electric-resistance welded tubes shall be 90 per cent of the values given in the table, and for lap-welded tubes shall be 80 per cent.

EXPLANATORY NOTE: The above proposed revised table and notes give in most cases allowable working pressures higher than those now permitted by the Code.

As there have been many years of experience with seamless and lap-welded tubes their behavior over long periods of service is well established. Electric-resistance welded tubes are relatively new and there has not been the extended service experience on which to finally judge their reliability. Because of this the Boiler Code Committee suggests that electric-resistance welded tubes be rated at 90 per cent of seamless tubes, and lap-welded tubes at 80 per cent of seamless tubes.

The Committee solicits all data that may be available on the use of boiler tubes, and opinions on the ratings which are tentatively proposed.

SUGGESTED REVISION OF TABLE P-2, A.S.M.E. BOILER CODE, FOR SEAMLESS STEEL BOILER TUBES FOR WATER-TUBE BOILERS[1]

The A.S.M.E. Boiler Code rules for the thickness of steel boiler tubes for water-tube boilers, Table P-2, have remained unchanged since the original Code of 1914. Table P-3, to cover wrought-iron tubes, was later added. At that time, steam pressures were generally low, and most water-tube boilers had either 4-in. tubes of 10 and 9 gage or 3¼-in. tubes of 11 and 10 gage. Long experience with these boiler tubes at steam pressures of about 160 to 250 lb per sq in. has been generally satisfactory.

Since 1914, boiler pressure has increased until today 1400–1500 lb per sq in. is common, and pressures equal to and exceeding the critical have been used in forced-circulation boilers. The range of both pressure and tube diameter is much greater than was expected when Table P-2 was formulated.

In September, 1931, E. Lupberger published a paper[2] discussing the newly revised German rules for tubes for water-tube boilers, and showed that tubes subject to radiant-heat absorption in the furnace require minimum thickness for hydrostatic pressure consistent with a reasonable factor of safety, to prevent unsafe stresses when the additional temperature stress is imposed. Mr. Lupberger showed that the new German rules gave approximately optimum thickness for the lowest combined stress at maximum heat-absorption rates in boiler furnaces.

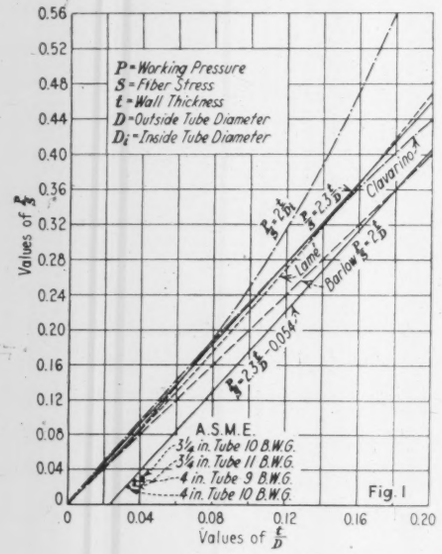


Fig. 1

In English units, the revised German rule for boiler tubes is

$$\frac{P}{S} = 2\,\frac{(t + 0.039)}{D_i}$$

where P = maximum allowable pressure, lb per sq in.
S = design stress, lb per sq in.
t = tube thickness, in.
D_i = inside diameter of tube, in.

Two grades of steel tubes are permitted, one having a maximum tensile strength of 49,780 lb per sq in. and the other 64,004 lb per sq in. The corresponding values of S in the formula are 9103 and 11,378 lb per sq in.

The formula is a modification of the Barlow formula with a constant additive thickness of 0.039 in. The factor of safety, based upon the minimum tensile strength, is 5.47 and 5.62, respectively.

The commonly used formulas for tubes subjected to internal pressure are plotted in Fig. 1. A straight line with the equation

$$\frac{P}{S} = 2.3\,\frac{t}{D}$$

is a very close approximation and an average

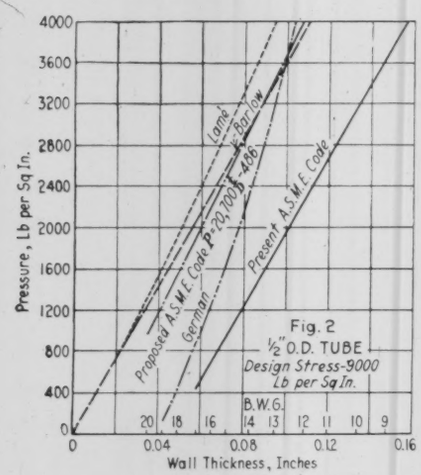


Fig. 2
½" O.D. TUBE
Design Stress-9000 Lb per Sq In.

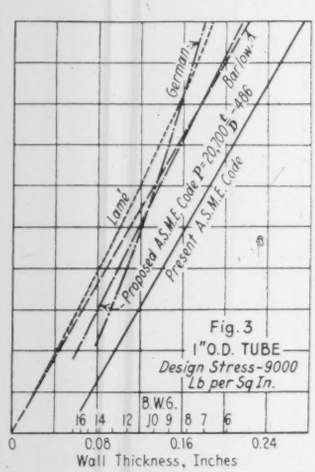


Fig. 3
1" O.D. TUBE
Design Stress-9000 Lb per Sq In.

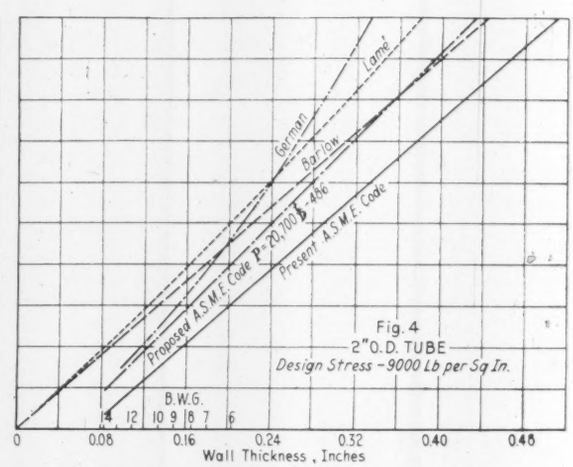


Fig. 4
2" O.D. TUBE
Design Stress - 9000 Lb per Sq In.

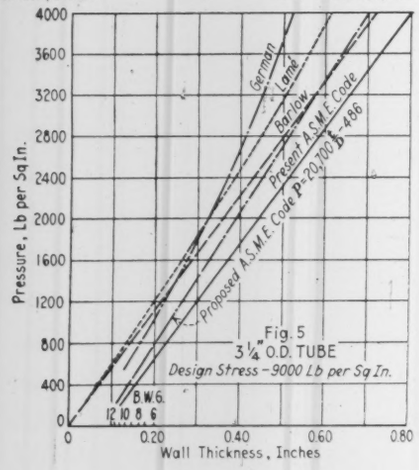


Fig. 5
3¼" O.D. TUBE
Design Stress - 9000 Lb per Sq In.

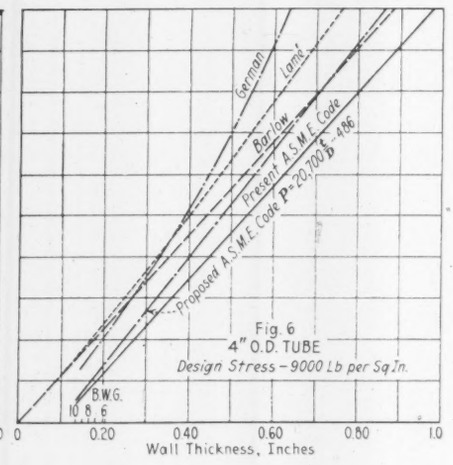


Fig. 6
4" O.D. TUBE
Design Stress - 9000 Lb per Sq In.

[1] Prepared by Perry Cassidy, chairman, Subcommittee on Material Specifications, A.S.M.E. Boiler Code Committee.

[2] "Bemessung von Siederohren für Hochleistungskessel," *Archiv für Wärmwirtschaft und Dampfkesselwesen*, vol. 12, pp. 267–269, September, 1931. Abstract, MECHANICAL ENGINEERING, December, 1931, pp. 934–937.

of both the Lamé and Clavarino formulas up to $\frac{P}{S} = 0.40$, corresponding to a pressure of 3600 lb per sq in. for a stress of 9000 lb per sq in., and is also a fair mean between the Common and Barlow formulas. This formula would indicate a safe stress for boiler tubes at all pressures, if it were not for the long and extensive experience with 4-in. and $3\frac{1}{4}$-in. tubes, for low pressures, with greater thickness than this formula would require. In Fig. 1, the relationship $\frac{P}{S}$ and $\frac{t}{D}$ for $3\frac{1}{4}$-in. tubes of 11 and 10 gage and 4-in. tubes of 10 and 9 gage, as given by present Table P-2, A.S.M.E. Boiler Code, is shown. A line drawn parallel to the line $\frac{P}{S} = 2.3\frac{t}{D}$ and offset by $\frac{t}{D} = 0.0235$ and $\frac{P}{S} = 0.054$ is slightly above these points. This means a constant additive thickness over the mean of the Lamé and Clavarino formulas of $0.0235D$, or 2.35 per cent of the outside diameter. In terms of pressure, the shifted formula gives a deduction of $0.054S$ below the mean of the Lamé and Clavarino formulas, or 486 lb per sq in. for $S = 9000$ lb per sq in.

Figures 2, 3, 4, 5, and 6 show the pressure-thickness relationship for $\frac{1}{2}$, 1, 2, $3\frac{1}{4}$, and 4-in. tubes, for $S = 9000$ lb per sq in., using the Lamé, Barlow, and German formulas, A.S.M.E. Boiler Code, and compared with $\frac{P}{S} = 2.3\frac{t}{D} - 0.054$, simplified to $P = 20{,}700\frac{t}{D} - 486$ for $S = 9000$, as proposed for revised Table P-2.

This would apply to grades A and B seamless steel tubes, Specifications S-17, based upon a minimum tensile strength of 45,000 lb per sq in. For grade-C tubes and alloy or other tubes of higher strength, the value of S might be consistently increased in proportion to the minimum tensile strength.

The working pressures given in Figs. 2 to 6 are for metal temperatures up to 700 F. For higher temperatures, such as for superheater tubes, the values of S may be reduced in proportion to the creep stress.

Table P-2 of the A.S.M.E. Boiler Code has always been based upon the minimum tube thickness. Rolling practice in the manufacture of hot-finished seamless steel tubes during this period has given an average wall thickness approximately $12\frac{1}{2}$ per cent greater than the nominal minimum.

It might be thought that the average wall thickness, rather than the minimum, would be safe and economically justified. However, this additive thickness has been included in all hot-finished seamless steel tubes upon which experience is based, and, for the average minimum-gage tube, has increased structural strength, and permitted a larger amount of corrosion. Since reduction in tube thickness is desirable largely at higher pressures, and the practice at lower pressures should remain unchanged, the use of the average wall thickness instead of the minimum, which would also be inconsistent with Boiler Code practice, is not recommended.

The increase in pressure allowed for tubes of smaller diameters is consistent and will better meet the requirements of forced-circulation boilers and superheaters.

The reduction in tube thickness for the higher pressures would result in an increase in inside diameter. Since the pressure drop in a tube varies as the fifth power of the inside diameter, this would mean a considerable reduction in pressure drop for the higher pressures.

The temperature stresses in tubes subjected to furnace radiation would be reduced in proportion to the reduction in thickness.

It is not contemplated that the minimum gage for tubes 2-in. and over in diameter will be reduced. Tubes for low-pressure water-tube boilers will, therefore, be practically the same as before—a requirement which is insisted upon by some state inspection authorities.

Letters and Comment

Stress Concentration and Fatigue Tests

TO THE EDITOR:

The paper by R. E. Peterson and A. M. Wahl entitled "Two- and Three-Dimensional Cases of Stress Concentration and Comparison With Fatigue Tests," which appeared in the March, 1936, issue of the *Journal of Applied Mechanics*,[1] deals with several basic questions in strength of material and presents evidence of significance to the designer.

The attitude of most engineers toward stress concentration in the past has been that the stresses are not as high as they are claimed to be and that even if they were they can be ignored, since structural materials are ductile and ductility will automatically prevent any serious harm from the large local stresses.

It is no doubt true that ductility has saved many a structure from destruction. However, it is equally true that ductility is of greater importance to the civil engineer than it is to the mechanical engineer.

An important point established by the authors is found in the fact that in fatigue the strength of shafts is not only influenced by stress concentration but that in large shafts it is completely determined by it. The quantitative agreement between what the authors call "theoretical" factors of stress concentration and fatigue factors is indeed remarkable in shafts more than 1.5 in. in diameter.

One reason why engineers "regard skeptically" photoelastic results is found in the transparent material of which photoelastic models are made. It is natural and reasonable to question the applicability of results obtained from celluloid and bakelite models to steel or other structural materials. The paper under discussion also bears on this point. Indirectly, the authors give additional evidence in support of the theory that within the elastic limit and in simply connected bodies the stress distribution and especially the factors of stress concentration determined photoelastically are directly applicable to steel specimens. This is admirably shown in Fig. 7 of their paper.

Furthermore, the data presented in Fig. 7 are especially significant in that they enlarge the scope of application of the photoelastic results. It shows that in circular shafts, at least, the factor of stress concentration in two and three dimensions are, for practical purposes, equal. It is interesting to note that the photoelastic factors of stress concentration are taken from tests of specimens in pure bending, while those from the steel shafts are from specimens in central bending; see Fig. 5 of the paper. This indicates that in large shafts the factors of stress concentration in pure bending are equal to the factors in central bending.

It would, perhaps, have been desirable to have made the strain measurements under pure bending or to have determined photoelastic factors for central bending. It is by no means certain that the factors of stress concentration would always be the same in these two cases. An exception may perhaps be taken to the use of the term "theoretical" to cover the mathematical, the photoelastic, and the strain-gage methods of determining stress distributions. These methods employ basically such different techniques that even though they are all based on the laws of elasticity, they should be distinguished from one another. That, however, is a minor point.

The writer was pleased to see the comparative curves of Fig. 1 of the authors' paper showing Neuber's mathematical results for deep grooves as compared with our own photoelastic results. The photoelastic technique has now been perfected to a high point of precision, and its results when obtained with caution invariably agree with those from sound theory.

MAX M. FROCHT.[2]

[1] Trans. A.S.M.E., vol. 58, 1936, pp. A-15–A-22.

[2] Associate Professor of Mechanics, Carnegie Institute of Technology, Pittsburgh, Pa.

REVIEWS OF BOOKS

And Notes on Books Received in the Engineering Societies Library

Aircraft Engines

AIRCRAFT ENGINES. By Arthur B. Domonoske and Volney C. Finch, John Wiley & Sons, Inc., New York, 1936, Cloth, 6 × 9 in., 342 pp., 79 figs., $3.75.

REVIEWED BY C. FAYETTE TAYLOR[1]

THIS book is intended to be a treatise on the fundamentals of the internal-combustion engine as applied to aircraft. The treatment is limited to the subjects of elementary thermodynamics, fuels and combustion, cooling, supercharging and engine testing. In support of the theoretical treatment, data are presented in the form of tables and curves based on aircraft-engine practice.

In general, the organization of the textual matter is poor and there is a general absence of sound quantitative treatment. Especially is this true of those portions of the book which deal with the thermodynamics of the fuel-air mixture and with the processes of combustion. This is largely due to dependence upon published material which is now distinctly out of date. For example, the theory of the preferential burning of hydrogen, page 97, and the use of the conception of two stages of combustion with "hang-fire period," page 151, are obsolete conceptions. The book would have been greatly strengthened if use had been made of the results of recent research on the thermodynamic properties of fuel-air mixtures, and on the character of combustion and flame propagation, as revealed by high-speed photography. On page 194 the treatment of fundamentals in regard to the effect of cylinder size and engine speed on thermal efficiency is poor. The application of simple laws of similitude can clear up this whole issue, and it is difficult to see why it was not employed in this instance.

Most of the data presented have been taken from N.A.C.A. Reports, the *S.A.E. Journal*, and the Air Service Engineering Handbook of 1923. Unfortunately, the source of the data is not indicated in every case.

[1] Professor of Automotive Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

Books Received in Library

ANLEITUNGSBLÄTTER FÜR DAS SCHWEISSEN IM MASCHINENBAU. V. D. I. Verlag, Berlin, 1936. Paper, 6 × 8 in., 52 pp., diagrams, charts, tables, 1 rm. This book discusses some practical problems connected with the use of welding in engine and machine construction. Stresses in welds, symbols, characteristics of good welds, and the design of welded frames are considered. The book is issued by the welding division of the Verein deutscher Ingenieure.

EINFÜHRUNG IN DIE KLASSISCHE ELEKTRODYNAMIK. By J. Fischer. Julius Springer, Berlin, 1936. Cloth, 7 × 10 in., 199 pp., diagrams, charts, tables, 13.80 rm. A well-arranged, concise, yet comprehensive, presentation of the classic theory of electrodynamics, intended for advanced students.

DAS ELEKTRISCHE EISENBAHNWESEN DER GEGENWART. (Elektrische Bahnen Ergänzungsheft, Jahrgang 1936.) Edited by W. Wechmann. Verlag für Sozialpolitik, Wirtschaft und Statistik, Berlin, 1936. Paper, 8 × 12 in., 212 pp., illus., diagrams, charts, tables, 6 rm. This publication contains nine lectures by various authorities upon the electrical railway of today, which were delivered before the Elektrotechnische Verein and the Extension Institute of the Berlin Technical University. The addresses provide a concise review of modern developments in electric-railway practice for trunk lines, street and underground railways, mountain railways, etc.

ELEMENTS OF PROBABILITY. By H. Levy and L. Roth. Clarendon Press, Oxford, England; Oxford University Press, New York, 1936. Cloth, 6 × 9 in., 200 pp., diagrams, charts, tables, $5. An elementary treatment of the subject in which the point of view is that "probability is an essential of scientific method, and that a probability estimate, however it is approached, has to be seen and interpreted as a guide in scientific procedure." At the same time the authors have striven to provide a detailed criticism of the various self-contained theories of probability that have been advanced from time to time.

ERDÖL. By K. Krejci-Graf. Julius Springer, Berlin, 1936. Cloth, 5 × 7 in., 163 pp., illus., diagrams, tables, 4.80 rm. (25 per cent reduction in U. S. A.). A good brief presentation, in popular style, of present views concerning the origin of petroleum. Some space is also given to its occurrence, production, etc. The book summarizes recent researches, is attractively printed and illustrated, and contains an excellent introduction.

ERHÖHUNG DER SCHNEIDGESCHWINDIGKEITEN BEIM BRENNSCHNEIDEN DURCH NEUE DÜSENFORMEN. By T. Zobel. V.D.I. Verlag, Berlin, 1936. Paper, 6 × 8 in., 34 pp., illus., diagrams, charts, tables, 2.75 rm. This report describes an investigation carried out at the Berlin Technical High School, with the object of designing more efficient nozzles for cutting metals. A new nozzle was designed which is claimed to be much more efficient than those in use.

HANDWÖRTERBUCH DER GESAMTEN TECHNIK UND IHRER HILFSWISSENSCHAFTEN. 2 vols. By R. Koch and O. Kienzle. Deutsche Verlags-Anstalt, Stuttgart and Berlin, 1935. Half-leather, 7 × 11 in.; vol. 1, 718 pp.; vol. 2, 788 pp.; illus., diagrams, charts, tables, 72 rm. An excellent dictionary of engineering and technology is provided in this two-volume work, which covers the same ground as Lueger's "Lexikon der gesamten Technik," but in much more concise fashion and with the inclusion of later information. The definitions are clear, and extensive enough for ordinary needs. The work may be recommended to all who need a dictionary of German technical terms.

HISTORY OF COKE MAKING and of the COKE OVEN MANAGERS' ASSOCIATION with a foreword by the Rt. Hon. Lord Gainford. Issued by the Coke Oven Managers' Association to commemorate its coming-of-age, 1936. W. Heffer & Sons, Ltd., Cambridge, England. Cloth, 6 × 9 in., 139 pp., illus., diagrams, tables. The history of coke making provides a concise, yet comprehensive account of developments throughout the ages. The volume has been prepared by a committee of the Coke Oven Managers' Association of Great Britain. The work is carefully done and well documented. The illustrations add much to its value.

HYDRAULICS. By C. W. Harris. John Wiley & Sons, New York, 1936. Cloth, 6 × 9 in., 220 pp., illus., diagrams, charts, tables, $2.75. The aim of this textbook is to provide a more scientific introduction to the subject than is usually attempted, in which the various principles are presented in the relationship most commonly encountered in engineering practice. Special emphasis is given to energy transfer and to cause and effect in general. Attention is given to the historic and scientific background, but at the same time the trends of modern industry are considered.

INGENIOUS MECHANISMS FOR DESIGNERS AND INVENTORS, Vol. 2. Edited by F. D. Jones. Industrial Press, New York, 1936. Leather, 6 × 10 in., 538 pp., diagrams, $5. This volume supplements the original work, which appeared in 1930. It contains a large number of mechanisms which are used in automatic machines and mechanical devices, including applications of cams, intermittent motions, tripping or stop mechanisms, over-load relief mechanisms and automatic safe-guards, reversing mechanisms, reciprocating motions, speed-changing mechanisms, special transmissions, centering and feeding mechanisms, etc. Over 300 illustrations are included.

A.S.M.E. NEWS

And Notes on Other Engineering Activities

Sessions of Council Held During A.S.M.E. Annual Meeting

1936 Council Adjourns; 1937 Council Organizes

SINCE the December issue, the Executive Committee of the Council of The American Society of Mechanical Engineers has held three meetings, the 1936 Council has met and adjourned, and the 1937 Council has had its first session and organized its committees.

Actions of Executive Committee, November 20

President Batt called a meeting of the Executive Committee of the A.S.M.E. Council to order at 10 a.m. on November 20 in the rooms of the Society. There were present Harry R. Westcott, William A. Shoudy, James W. Parker, of the committee; Kenneth H. Condit (Professional Divisions), William T. Conlon (Finance), J. N. Landis (Local Sections) of the advisory members; James H. Herron, president-elect; William D. Ennis, treasurer; and C. E. Davies, secretary. The following actions are of general interest.

James A. Hall

The death on October 29 of James A. Hall,

JAMES A. HALL

member of the A.S.M.E. Council, was reported, and a committee consisting of Harry R. Westcott and S. W. Dudley was appointed to draft suitable resolutions. (These resolutions were adopted by the Council and may be found on page 18 of this issue.)

A.E.C. Representatives

The following representatives and alternates on the American Engineering Council were appointed for a one-year term: Representatives, James H. Herron (chairman), L. P. Alford, R. E. Flanders, Paul Doty, and W. L. Batt; alternates, W. A. Hanley, E. L. Ohle, E. W. O'Brien, J. T. Faig, and Sabin Crocker.

E.C.P.D. Accrediting Program

In the November issue of MECHANICAL ENGINEERING was published a list of engineering schools in the New England and Middle Atlantic States that have been accredited in accordance with the program of the Engineers' Council for Professional Development. In view of the fact that completion of the E.C.P.D. accrediting program for the entire country will have a bearing on qualifications of engineers seeking admission to the Society and on the Society's policy for operating Student Branches, the president was authorized to appoint a committee, representing the Committee on Admissions, the Committee on Relations With Colleges, and the Accrediting Program, to study these matters and report to the Council.

Staff Personnel

The secretary reported the death, on October 16, of J. B. Patterson, the Society's representative in Chicago. Glenn B. Eddy, it was reported, has been retained as advertising representative of the Society in the Mid-West area.

The resignation, effective February 1, 1937, of P. T. Wetter, member of the staff since 1927 in charge of professional division activities, was announced.

Appointments

The following appointments were reported for record:

Special Research Committees: On Strength of Vessels Under External Pressure, M. P. Higgins; on Fluid Meters, M. J. Zucrow; on Cottonseed Processing, R. Brooks Taylor.

Standardization Sections Committees; Graphical Symbols and Abbreviations for Use on Drawings, Thomas E. French, Frank C. Panuska; Letter Symbols and Abbreviations for Science and Engineering, R. J. S. Pigott, S. R. Beitler (alternate).

Boiler Code Subcommittee on Ferrous Materials, E. F. Kenney.

Honorary Chairmen Student Branches: Newark College of Engineering, Newark, N. J., Frank D. Carvin; University of Maine, Orono, Me., William J. Sweetser; College of City of N. Y., New York, N. Y., G. J. Bischof; Case School of Applied Science, Cleveland, Ohio, G. B. Carbon; Colorado State College, Ft. Collins, Colo., Dudley P. Craig; Armour Institute of Technology, Chicago, Ill., Daniel Roesch; Johns Hopkins University, Baltimore, Md., F. W. Kouwenhoven.

Joint Committee on Ambrose Swasey Celebration, Harvey N. Davis.

Special Committee on Membership Development, Dexter S. Kimball, chairman; E. G. Bailey, Walter S. Finlay, Jr., Geo. A. Orrok, and C. G. Spencer.

Actions of Executive Committee, November 29

The Executive Committee of the Council of The American Society of Mechanical Engineers met at the Engineers' Club, New York, on November 29, at 2 p.m. There were present W. L. Batt, chairman; Harry R. Westcott, William A. Shoudy and James W. Parker, members of the committee; William T. Conlon (Finance), Kenneth H. Condit (Professional Divisions), W. Lyle Dudley (Local Sections), advisory members; James H. Herron, president-elect, A.S.M.E.; and C. E. Davies, secretary, A.S.M.E. Actions of general interest were as follows:

R. I. REES

Transfer of Students to Junior Grade

On recommendation of the Committee on Local Sections the date before which student members may transfer to junior membership was advanced from September 30, 1936, to June 30, 1937.

Death of R. I. Rees

The death of Gen. Robert I. Rees, former member of the Committee on Meetings and Program and vice-chairman of the Engineers' Council for Professional Development was reported, and President Batt was requested to express to General Rees's family the sincere sympathy of the committee.

Boiler Tubes

Communications from manufacturers relat-

ing to standards for boiler tubes now in process of formulation by the Boiler Code Committee were referred to that committee.

Actions of A.S.M.E. Council

A meeting of the Council of The American Society of Mechanical Engineers was held in the rooms of the Society, New York, N. Y., on November 30, 1936, and was called to order by President Batt at 9:30 a.m. There were present past-presidents, Roy V. Wright, A. A. Potter, Paul Doty, and Ralph E. Flanders; vice-presidents, Eugene W. O'Brien, James H. Herron (president-elect), Harry R. Westcott, Alex D. Bailey, John A. Hunter, R. L. Sackett, and William A. Shoudy; managers, Ernest L. Ohle, Jiles W. Haney, W. Lyle Dudley, Walter C. Lindemann, and James W. Parker; Secretary C. E. Davies; chairmen or representatives of standing committees, Finance, William T. Conlon; Publications, Samuel W. Dudley (manager-elect); Admissions, R. H. McLain; Professional Divisions, Kenneth H. Condit (manager-elect); Local Sections, A. J. Kerr; Constitution and By-Laws, H. H. Snelling; Relations With Colleges, E. W. Burbank (manager-elect); Education and Training for the Industries, C. J. Freund; Power Test Codes, R. H. Fernald; Safety, W. M. Graff; Council-member elect, R. J. S. Pigott; Group Delegates, R. M. Barnes and Theodore Baumeister, Jr.; guests, R. L. Daugherty, and S. R. Beitler; staff member, George A. Stetson, editor.

Tribute to James A. Hall

A tribute to James A. Hall, deceased member of the Council was read and ordered entered in the minutes. (The text of this tribute will be found on page 18 of this issue.)

Annual Committee Reports Accepted

Annual reports of all standing and special committees and the annual report of the council, in printed form, were submitted and accepted by vote of the council.

Executive Committee

Actions of the Executive Committee taken at its meetings of November 20 and 29 were reported and approved.

Tributes to Staff Members

Tributes to Frances Selig, Ernest Hartford, and Leon Cammen, all of whom have been members of the secretary's staff for 25 years or more were read, and it was voted that the Council adopt the policy of recognizing members of the staff whose term of service to the Society should reach this number of years. (Leon Cammen died on December 4, following a long illness.)

In accordance with the vote of the Council that these tributes be published in MECHANICAL ENGINEERING they are made a part of this report.

Frances Selig

Coming to the Society for her first job, Miss Frances Selig is entering on her thirtieth year in its service, marked throughout by devoted effort.

After her period of general apprentice service, she acted as secretary to the editor, Lester G. French. Later she served as administrative assistant on Society meetings as well as on publications. From 1926 through 1931 she was in complete charge of the publication of the Society membership lists. During the Fiftieth Anniversary Celebration Miss Selig was in direct supervision of the vast amount of administrative detail, the painstaking attention to which meant so much to the successful outcome of that most important occasion.

Since 1932, as assistant to the secretary and executive secretary, the routine of the Council, Executive Committee, and the special committees of the Council has been in her direct charge. The work in the A.S.M.E. office on E.C.P.D. has all passed through her hands.

In all of these assignments; she has taken responsibility easily, has shown splendid initiative and has completed them satisfactorily with credit to the Society and to herself. She has a gift for clear written expression and a faculty for systematic organization of work that has made her invaluable as a secretary. Experienced in Society work, loyal to its aims, and ready to meet any emergency demand with unstinted effort, Miss Selig is awarded the appreciation of the Council for past services, and its good wishes in future years of fruitful service.

Ernest Hartford

In July of this year, Ernest Hartford completed a quarter-century of zealous effort in behalf of the Society.

Mr. Hartford's responsibilities with the

ERNEST HARTFORD

Society have covered a wide range, including the administrative routines of admissions, membership increase, sections and student-branch operation, awards, employment, and since 1933 divisions and meetings operation.

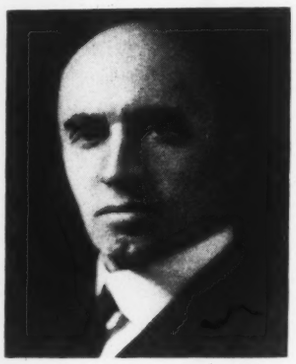
To all of these activities he has contributed from his fertile imagination, his ability to deal particularly with troublesome situations, and his splendid capacity for friendship which has been translated with practical helps to many individual members.

While in the minds of most members Mr. Hartford is usually thought of in terms of the splendid contribution he has made to the work of the sections, it is important to recognize his other responsibilities and the splendid manner in which he has discharged them. Typical is his interest in the problem of employment where his keen understanding of the needs of the unemployed engineer has caused many to turn to him for help. He has traveled widely at great sacrifice to his family circle. He has made and kept many friends in the Society service. His contribution to the development of the new scheme of student-branch operation has been very great.

For all his loyal services, the Council records its appreciation and conveys its good wishes for continued success.

Leon Cammen

Twenty-five years ago when improvements in service to members of The American Society of Mechanical Engineers were being inaugu-



LEON CAMMEN

rated in the Society's "Journal," a "Foreign Review" was contemplated. The purpose of this review was to provide liberal illustrated abstracts of significant engineering papers published abroad. The selection of the articles for this "Review" and the preparation of the abstracts in English required a man with engineering education and experience, sound judgment, and a command of several languages. Mr. Leon Cammen possessed this rare combination of abilities, and for a quarter of a century he has exercised his talents in preparing abstracts that have appeared monthly without interruption during this period.

Mr. Cammen's background proved to be excellent for the task the Society asked him to do. A Russian by birth, he was educated in that country and in France, receiving his university education at Oxford, England. In the years that followed, Mr. Cammen's work took him into every part of Europe and Asia, and he became an experienced linguist with a command of more than a dozen languages.

Mr. Cammen's work in this country, in addition to his editorial duties (he serves the Society on a part-time basis) has been in engineering consultation and promotional fields. He is an authority on the subjects of economics, lubrication, mathematics, metallurgy, aeronautics, and communication, and has written extensively on all of them. He holds many patents, including some in the field of centrifugal casting, a subject on which he presented a paper to the Society.

A recent illness due to overwork made it necessary for Mr. Cammen to ask for a leave of absence, which the Council granted him. Unwilling to interrupt the long record of his foreign review in MECHANICAL ENGINEERING

he has been providing material for it in spite of his impaired health.

Mr. Cammen is highly beloved and respected by his colleagues on the A.S.M.E. staff, who admire his extreme modesty, his phenomenal memory, and his powers of acute observation in addition to his broad knowledge.

In recognition of Mr. Cammen's long and valued service the Council records its grateful appreciation.

Senior Councilors' Report

President Batt recalled the fact that he had appointed a "Senior Councilor" for every one of the seven geographical groups into which the A.S.M.E. local sections are divided, and that the Council had voted to ask each session councilor to report at the Annual Meeting. He therefore called on each in his turn. A résumé of each councilor's report follows:

Harry R. Westcott, for Group I, said that his experience showed that the experiment was worth while from the point of view of the members. It was his opinion that the plan should be continued. In his duties as senior councilor for Group I he had discussed Society affairs with the sections in his territory with gratifying results. He said that the senior councilors are in a position to be of constructive services to the Society.

William A. Shoudy, representing Group II which includes a single section, the Metropolitan, found the task of keeping in touch with the section was easily accomplished by attending meetings of the Executive Committee of the Metropolitan Section. His contacts with student branches in the Metropolitan area had been useful, he thought. It was his opinion that the senior councilors could take many responsibilities from the shoulders of the president. He recounted incidents to prove that the time he had spent in discussing Society affairs with individual members was fruitful of better feelings and had been heartily and sincerely appreciated by the members so served.

Robert L. Sackett reported on his attendance at the Group III Conference held at Ithaca, N. Y., on October 31, 1936. Dean Sackett is senior councilor for this group. He reviewed the principal discussions that had taken place at this conference.

Eugene W. O'Brien, for Group IV, said that in the South where sections had small memberships, he had been asked to speak many times on subjects not concerning the A.S.M.E. exclusively but dealing with the profession as a whole, as many nonmembers were present at these gatherings. The plan, he said, worked well and several new members had been attracted to the Society as a result of it. He reported that President Batt had made an extremely favorable impression in the South during a recent trip. On the occasion of the meetings he attended, Mr. O'Brien made it a point to meet with local executive committees and discuss Society problems with him.

James H. Herron, reporting for Group V, said that if senior councilors could arrange to sit with the executive committees of the sections in their territories useful contacts with the Council would be established. His experiences had impressed him with the value of these contacts. He also reported that the publications of the Society should be strengthened.

Alex D. Bailey, for Group VI, reported that the deaths of R. R. Leonard and J. B. Patterson, who had represented the Society in that area, had deeply affected the section in that group. In his opinion the resuscitation of the Chicago office was necessary. He had not been able to visit many sections since September. With the general resumption of business on an improved basis he believed that every effort should be made to reinstate members who had dropped out for financial reasons.

John A. Hunter, Group VII, reported that his trip to visit local sections on the Pacific Coast had been interrupted by illness, although he had had a three-hour session with the Los Angeles Section and had also been able to visit San Francisco. W. Lyle Dudley, he said, had taken over his work.

W. Lyle Dudley reported on his visits to sections and branches in Group VII. In his opinion the visits in this area made by Presidents Flanders and Batt had done much to improve the general feeling of members on the Pacific Coast.

President Batt expressed his regret that, because of distance, members on the Pacific Coast could not easily serve on Society Committees. In his opinion officers of the Society should make it a duty to visit first the less active sections and branches.

R. L. Daugherty reported that President Batt had made a distinctly favorable impression in the Los Angeles area and had done much to clear up misunderstandings that result from its remoteness from Headquarters. He said that more money and greater cooperation from New York would result in better feelings.

Elections to Fellow Grade

The Committee on Admissions reported that at a special meeting held on November 5 James A. Hall, member of the Council, deceased, had, by unanimous vote, been transferred to the grade of fellow. Professor Hall thus becomes, posthumously, the first Fellow of The American Society of Mechanical Engineers. The Committee also reported that at meetings on November 5 and 10, 73 past and present members of the Council had been transferred to the fellow grade. The names of the newly transferred fellows are as follows:

William L. Abbott	Paul Doty
Leon P. Alford	Alex Dow
Charles M. Allen	Everett O. Eastwood
Robert W. Angus	Robert H. Fernald
Alex D. Bailey	Walter S. Finlay, Jr.
Charles Whiting Baker	Edwards R. Fish
Bennett M. Brigman	Ralph E. Flanders
George M. Brill	Robert M. Gates
A. G. Christie	Harry A. Gillis
Harold V. Coes	Charles E. Gorton
Morris L. Cooke	Arthur M. Greene, Jr.
David F. Crawford	Jiles W. Haney
James D. Cunningham	William A. Hanley
L. P. Breckenridge	John Lyle Harrington
Robert L. Daugherty	James H. Herron
Harvey N. Davis	C. F. Hirshfeld
A. J. Dickie	John A. Hunter
Harold L. Doolittle	Ely C. Hutchinson
Frederick H. Dorner	Alfred Iddles
William B. Jackson	George I. Rockwood
Emil E. Keller	Percival Roberts, Jr.
William H. Kenerson	Robert L. Sackett
Dexter S. Kimball	Will J. Sando
Conrad N. Lauer	Earl F. Scott
John H. Lawrence	Robert Sibley
Charles T. Main	T. B. Stearns
Fred J. Miller	Edward N. Trump
Irving E. Moultrop	Henry H. Vaughan
Edward A. Muller	Harry R. Westcott
Ernest L. Ohle	Thomas R. Weymouth
George A. Orrok	Elliott H. Whitlock
Hollis P. Porter	Herbert L. Whittemore
Andrey A. Potter	Thomas L. Wilkinson
H. G. Reist	Robert B. Wolf
Arthur L. Rice	Paul Wright
Charles Russ Richards	Roy V. Wright
D. Robert Yarnall	

Policies and Budget Committee Discharged

On the recommendation of Harry R. Westcott, chairman, the Committee on Policies and Budget was discharged with the sincere appreciation of the Council, and with a recommendation to the 1937 Council that a Committee on Aims and Objectives be established.

Standardization Committee Reports

A résumé of the Standardization Committee's work was presented by its chairman, Alfred Iddles, with a statement of the present status of the standards for which the A.S.M.E. is a joint sponsor. There are now, he said, 32 projects under way that are sponsored either exclusively or jointly by the Society and these projects engage the attention of 1277 men from all over the country. As to the future work of the Committee, Mr. Iddles said, no recommendations were to be made. Expansion of the Committee's activities, he reported, was hampered by lack of staff personnel.

The present status of completed standardization projects was reported to be as follows:

Mechanical standards projects completed and approved by A.S.A.: Dec. 1, 1935, to Dec. 1, 1936; Brass Fittings for Flared Copper Tubes (A40.2), Socket Setscrews and Socket Head Cap Screws (B18.3), Pipe Plugs (B16e2), Circular and Dovetail Forming-Tool Blanks (B5.7), Chucks and Chuck Jaws (B5.8), and Lathe Spindle Noses (B5.9).

Additional projects in process of discussion by other sponsors and approval by A.S.A.: Machine Tapers (B5), Twist Drills (B5), Taps (Revision) (B5), Adjustable Adapters for Multiple Spindle Drilling Heads (B5), Terminology for Single-Point Tools (B5), Steel Welding Neck Flanges (B16), Large Rivets (B18), Wrench-Head Bolts and Nuts and Wrench Openings (Revision) (B18), Round Unslotted Head Bolts (Revision) (B18), Plain Washers (B27), Time Series Charts (Z15), and Pressure and Vacuum Gages (B40).

Safety Committee's Report

For the Safety Committee, W. M. Graff, chairman, reported that its work was closely associated with that of the Standardization Committee. In his opinion there was an insufficient amount of publicity devoted to the work of the Safety Committee and hence members had not been sufficiently informed of its objectives and accomplishments. He said that when the work of the Safety committees

reached definite stages of progress, announcements should appear in the Society's publication for the information of members.

Constitutional Amendments Discussed

Much discussion of proposed changes in the Constitution engaged the remainder of the morning session. These changes were further discussed at the business meeting with results announced on page 19 of this issue.

Afternoon Session

Following a recess the Council reconvened at 4:30 p.m. In addition to those present at the morning session were the following: Past-President C. N. Lauer; group delegates, A. L. Davis, W. L. Edel, V. M. Frost, J. P. Harbeson, Jr., R. S. Brescka, L. J. Lassalle, S. B. Earle C. A. Koepke, E. O. Eastwood, D. R. Gray; representatives of standing and special committees, Local Sections, J. N. Landis; Nominating Committee 1937, L. E. Jermy; guests, D. B. Prentice, E. S. Ault; and staff member, Ernest Hartford.

Amended By-Laws Adopted

Amendments to the By-Laws, which had been submitted for a first reading at the June, 1936, meeting of the Council and as recommended by the Committee on Constitution and By-Laws, were adopted, with a few minor changes, to become effective as of the date of the approval by membership ballot of changes in the Constitution.

Roll Called on Membership Development

The secretary reported replies from the Sections on the membership development program. Cooperation was promised by most sections, several of which had set up committees to undertake the work. A number of new members resulting from the sections' efforts were reported.

Local Sections Committee

A request by the Committee on Local Sections for an increased appropriation for its work was referred to the Finance Committee in conformity with the policy of the Council.

Ithaca Section Authorized

At the recommendation of the Committee on Local Sections a petition of 42 members of the Society resident in the Ithaca area, asking for the establishment of a section, was presented, and the organization of the Ithaca Section was authorized.

Committee on Education and Training for the Industries States Objectives

The following objectives of the Committee on Education and Training for the Industries were presented by C. J. Freund, chairman of the Committee, for the consideration of the Council:

(*a*) To inform the membership of the Society regarding significant trends and efforts in the nonprofessional training of men in industry.

(*b*) To simulate and promote the training of men below the professional level in and for industry.

(*c*) To determine or assist in the determination of principles and procedures for the training of men below the professional level in and for industry.

(*d*) To formulate and publish a definition of the technician in industry.

Members of Council voted to give individual consideration of these objectives and to take the matter up at the Detroit Meeting of the Council in May.

Council Meeting of December 4

President Batt called to order an adjourned meeting of the 1936 A.S.M.E. Council at 9:30 a.m., December 4, in the rooms of the Society. There were present: Past-Presidents Roy V. Wright, Conrad N. Lauer, A. A. Potter, and Paul Doty; Vice-Presidents Eugene W. O'Brien, James H. Herron (president-elect), Harry R. Westcott, John A. Hunter, and R. L. Sackett; Managers E. L. Ohle, James M. Todd (vice-president elect), Bennett M. Brigman, Jiles W. Haney, Alfred Iddles, W. Lyle Dudley, Walter C. Lindemann, and James W. Parker; Treasurer W. D. Ennis; Secretary C. E. Davies; R. J. S. Pigott (council member elect); Chairmen and Representatives of Standing Committees: Admissions, R. H. McLain; Constitution and By-Laws, H. H. Snelling; Education and Training for the Industries, C. J. Freund; Finance, William T. Conlon; Local Sections, W. Lyle Dudley (council member), W. R. Woolrich; Meetings and Program, Harvey N. Davis; Professional Divisions, Kenneth H. Condit (council-member elect); Publications, S. W. Dudley (council-member elect), W. F. Ryan, and George F. Bateman; Relations With Colleges, E. W. Burbank (council-member elect), and Roy V. Wright (council member); Safety, W. M. Graff, and Harry H. Judson; Standardization, Alfred Iddles (council member); guests, S. R. Beitler, R. L. Daugherty, and C. E. Gorton; staff members, George A. Stetson and Ernest Hartford.

Actions of general interest are reported as follows:

Resolution of Thanks

A resolution of thanks to all persons and groups participating in and contributing to the 1936 Annual Meeting was read and adopted.

Relations With Colleges

E. W. Burbank, chairman of the Committee on Relations with Colleges, presented certain recommendations and resolutions that were referred to the appropriate committees for report to the Council.

1937 Council Convenes

Following a motion to extend to each retiring member of the 1936 Council the sincere appreciation for their cooperation during the year, the Council adjourned and the 1937 Council immediately convened with James H. Herron, president, presiding. Introductions of newly elected members of the Council were made and a vote of gratitude and appreciation was extended to Mr. Batt. Harry R. Westcott was appointed to fill until the next election in 1937 the office of vice-president left vacant by the death of James A. Hall.

Election of Secretary and Treasurer

C. E. Davies was reelected secretary and William D. Ennis was reelected treasurer of the Society.

Executive Committee Appointed

On nomination by the president the following were elected to serve on the Executive Committee of the Society for the administrative year 1937: James H. Herron, chairman, William A. Shoudy, Harry R. Westcott, James W. Parker, and Kenneth H. Condit, members.

Senior Councilors Appointed

The following senior councilors were appointed by the president to serve for 1937: Group I, Harry R. Westcott, of New Haven, Conn.; Group II, William A. Shoudy, of New York, N. Y.; Group III, R. L. Sackett, of State College, Pa.; Group IV, James A. Todd, of New Orleans, La.; Group V, B. M. Brigman, of Louisville, Ky.; Group VI, Alex D. Bailey, of Chicago, Ill.; Group VII, John A. Hunter, of Boulder, Colo.

Appointments

Presidential appointments to standing committees were announced. These will be included in the personnel of the committees to be published in the Membership List now scheduled for mailing on February 10, 1937, and hence will not be reported at this time.

Advisory Boards Continued

On recommendation of the chairman the Advisory Board on Technology was voted continued for one year, and the Advisory Board on Standards and Codes for two years. The Advisory Board on Professional Status was voted continued for a two-year period, expiring March, 1939.

Special Committees

Special committees on Employment (Member Relations), Joint Activities, and Public Affairs, which have completed their duties, were discharged. The following special committees whose duties are not completed are to be continued: Board of Review, Certificates of Indebtedness—Trustees, Citizenship (Manual on), Economic Status of the Engineer, Freeman Fund, Manual of Practice, Mechanical Catalog, Membership Development, National Defense, Registration, Calvin W. Rice Memorial, Spirit of St. Louis Medal Board of Award, Westinghouse Memorial (90th Birthday Celebration), and George Westinghouse Bust.

On recommendation of the Committee on Policies and Budget a committee to be known as the Committee on Aims and Objectives was established.

Fellow Grade of Membership

Following a lengthy discussion of the new fellow grade of member it was voted to appoint a committee of three to submit recommendations to the Council regarding the proper interpretation of qualifications for the fellow grade for the guidance of the Committee on Admissions.

1939 Annual Meeting

Harvey N. Davis, chairman, Committee on Meetings and Program, apprised the Council that the committee was considering the experiment of holding a future annual meeting outside New York, and that the 1939 New York World's Fair might make such a departure

from custom advisable. The Council requested the committee to report in greater detail on the plan and submit recommendations at a later meeting.

Publications

W. F. Ryan, for the Committee on Publications, presented a recommendation for additional funds for enlarging and improving the Society's publications. The Council voted to approve the recommendation in so far as practicable in view of the financial requirements of other committees and referred it to the Finance Committee.

Invitations to Los Angeles

R. L. Daugherty presented an official invitation from the Los Angeles Chamber of Commerce to the Society to hold its 1939 Semi-Annual Meeting at Los Angeles. The invitation was referred to the Committee on Meetings and Program.

Executive Committee Meeting December 4

At the first meeting of the Executive Committee of the 1937 Council of The American Society of Mechanical Engineers, held at the Engineers' Club, New York, N. Y., there were present James H. Herron, chairman; Harry R. Westcott, James W. Parker, and Kenneth H. Condit members of the committee; and C. E. Davies, secretary.

Meetings for the first five months were tentatively scheduled; the January meeting being set for January 15, at Washington, D. C., at the time of the Annual Meeting of the American Engineering Council.

President Herron asked that Mr. Batt's presidential address on society affairs (see pages 5 to 9 of this issue) be studied by all members of the committee before the next meeting.

The committee accepted in principle the suggestion made by Kenneth H. Condit that unassigned members of the Council be assigned to keep in touch with the activities of the professional divisions. Mr. Condit was asked to make further detailed recommendations at the next meeting of the committee.

Conference of A.S.M.E. Senior Councilors

A CONFERENCE of the senior councilors of the 1937 Council of The American Society of Mechanical Engineers was held in the Society rooms New York N. Y. on Friday December 4 at 2:30 p.m. Meeting with President Herron who presided were Harry R. Westcott Group I; R. L. Sackett, Group III; James M. Todd, Group IV; B. M. Brigman, Group V; John A. Hunter, Group VII; and C. E. Davies, secretary.

President Herron emphasized the value of the work done by the senior councilors in Mr. Batt's administration and stated that he planned to continue to develop the usefulness of the duties of these representatives.

The program on Society development was discussed and the assistance of the senior councilors was solicited in bringing about improved methods of scrutinizing applicants for membership.

The president reported the desire of the professional divisions to be represented more directly on the Council and advised that a plan be formulated for giving members of the Council unassigned to other duties the responsibility of forming contacts with the divisions.

The secretary was asked to prepare a manual containing information which would assist the senior councilors in answering such questions as are put to them by members concerning Society affairs.

Power Show of Wide Interest

THE Twelth National Exposition of Power and Mechanical Engineering was held at the Grand Central Palace, New York, November 30 to December 5. Three floors of exhibits of wide variety attracted large attendance of visitors representing engineers, industrialists, students of engineering and trade schools, operating men and mechanics, a surprising number of boys and women, and technically minded persons generally.

Exhibits covered a wide range of materials and machines, and many examples of excellent showmanship were noted. Some of the exhibits of materials were cleverly shown to indicate the percentages of alloying elements they contained and the particular uses to which they were best suited. Impressive also were the valves for high pressures, their heavy construction emphasized by the size of the flow openings they provided.

Variable-speed drives of several types were interestingly displayed and attracted much attention. Some of the animated exhibits of the steel companies captured admiring throngs. Materials-handling equipment, cutting machines, tubing for heat exchangers and condensers, and boiler tubes made by several processes were on display. The boiler manufacturers showed drawings of steam-generating units of every conceivable type and of a wide range of capacities. Instruments, as usual, were there to delight the eye and heart of the man who appreciates fine workmanship and delicate but reliable mechanisms. Insulation of several types made of cork, glass, asbestos, and other materials and fire brick and other heat-resisting materials were on display. Electrical machinery and control equipment were featured by their manufacturers, and included a great variety of electrically driven tools. Lubrication and lubricants were in evidence, as were also countless numbers of equipment, not impressive in size but important in function, that are so essential to operation and maintenance. Nor were drafting instruments and supplies forgotten. Devices for eliminating vibration and noise also attracted attention.

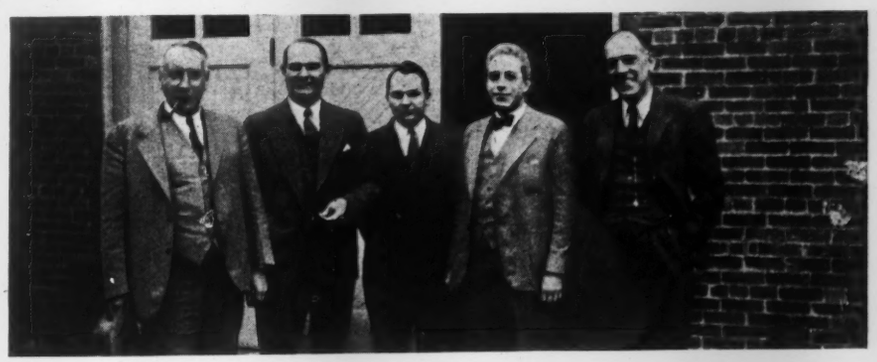
Last but not least were displays of technical periodicals and book publishers, and booths of industrial and trade associations, one of which served as headquarters for the A.S.M.E.

Coming as it did at a time when the A.S.M.E. was meeting in New York the show attracted a great many members of the Society, and those who could spare enough time from technical sessions and committee meetings had an opportunity to see an extraordinary number of instructive displays of materials and equipment with which their technical interests are engaged.

New A.S.M.E. Publications Circular Issued

A NEW circular and price list of A.S.M.E. publications has just been issued by the Publications Sales Department of the Society.

The circular describes the periodical publications, MECHANICAL ENGINEERING, the Transactions, and the *Journal of Applied Mechanics*. It also contains descriptions and prices on the fluid-meter publications; the A.S.A. standards for machine-shop practice, piping, drawing charts, abbreviations, and symbols; the power-test and boiler codes, and the codes for pressure piping and elevators. In addition the series of A.S.M.E. biographies and several special booklets and bibliographies are listed. The forthcoming Handbook on Cutting Metals with Single-Nose Tools is also announced as for publication in the spring of 1937.



ON ONE OF MR. BATT'S VISITS TO THE COLUMBUS SECTION
(Left to right: John Younger, W. L. Batt, S. R. Beitler, F. W. Marquis, and Paul Bucher.)

Gar Wood to Give Talk on "Speed in Water"

THE program committee of the Junior group of the Metropolitan Section of the A.S.M.E. feels particularly happy to announce that it has secured as a speaker for a meeting on January 14 in the Engineering Societies Building, New York, Gar Wood, the well-known motor-boat racing driver.

Mr. Wood will speak on "Speed on Water" and will supplement his talk with a new sound film of *Miss America X* in which will be shown the boat's construction, its speed trials and record-making run of 124.91 mph on the St. Clair River, and shots of the Harmsworth Trophy Race with the British. Mr. Wood has also kindly agreed to stay after the meeting to talk with those especially interested and to answer their questions.

It is a particularly timely meeting coming as it will during the week of the Annual Motor Boat Show in New York and will undoubtedly attract a large crowd. So remember the date, January 14, and come early.

Admiral Hobson to Speak on National Defense

ADMIRAL RICHMOND P. HOBSON will be the guest of honor and principal speaker at a general meeting of the Metropolitan Section of The American Society of Mechanical Engineers on the evening of February 9, 1937, in the auditorium of the Engineering Societies Building, New York City. The meeting is being sponsored by the group of Juniors of the Metropolitan Section interested in problems of national defense, which will be Admiral Hobson's topic. Other prominent men of military standing will also address the meeting.

A.S.M.E. Calendar

of Coming Meetings

February 26, 1937
Process Industries Meeting
Rutgers University

May 14–15, 1937
National Rayon Textile
Conference, Washington, D. C.

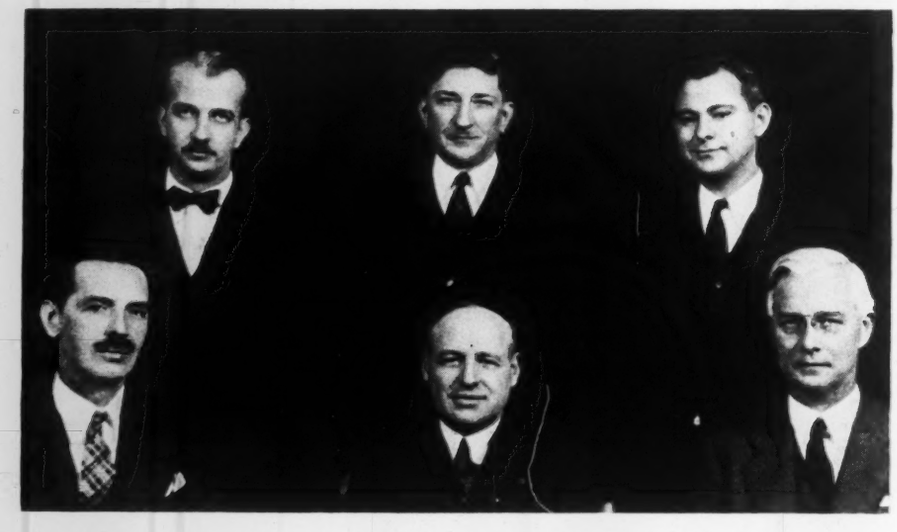
May 17–21, 1937
Semi-Annual Meeting,
Detroit, Mich.

May, 1937
Graphic Arts Meeting,
New York, N. Y.

June 24–25, 1937
Applied Mechanics Meeting
Cornell University

June, 1937
Oil and Gas Meeting
Pennsylvania State College

Local Sections Meetings
See page 64



STANDING COMMITTEE ON LOCAL SECTIONS FOR 1937
(*Standing*, left to right: A. J. Kerr, Ernest Hartford, J. N. Landis. *Sitting*, left to right: W. R. Woolrich, Wm. Lyle Dudley, D. B. Prentice.)

Standing Committee on Local Sections Holds Important Conferences at Annual Meeting

THE Committee on Local Sections held several conferences during the Annual Meeting both with officers of the Society and members of other Standing Committees to help them in the framing of a number of important actions affecting the administration of Sections. Present at these conferences were Committee members William Lyle Dudley, J. N. Landis, W. R. Woolrich, D. B. Prentice, A. J. Kerr, O. B. Schier, 2d, Robert Thornley, and Ernest Hartford.

Among these actions was the recommendation that the petition presented by members of the A.S.M.E. in Ithaca, N. Y., for permission to organize a Local Section be granted by the Council provided the necessary finances can be arranged.

The Committee also decided to enlarge the territory covered by the Charlotte, N. C., Section to include all members of the Society residing within a radius of 75 miles of Charlotte.

A request from the Indianapolis Section to change its name to the Central Indiana Section was approved.

The West Virginia Section reported a reorganization movement and to put this movement on a more logical area basis the territory south of parallel 39 within the State of West Virginia was made the new territory of the Section. Members in other parts of the State were assigned to the Pittsburgh Section.

The name of the Houston Section was changed upon request to the South Texas Section.

A new policy was adopted by the Committee whereby those Sections with a decreased membership would be discontinued if the number of members in good standing fell below a minimum of 15.

Upon the recommendation of the Committee President Herron appointed Herbert L. Eggleston of Los Angeles to the Committee for a five-year term ending December, 1941. William Lyle Dudley of Seattle retired from the Committee after serving six consecutive years during which he rendered a valuable service, particularly by his many visits to Sections in the area west of the Mississippi.

The next meeting of the Committee will be held in St. Louis, Mo., some time during February.

E. E. Howard Addresses Kansas City Section, November 19

Joint Meeting With Other Engineering Society Sections on November 24

MEMBERS of the Kansas City Section of the Society attended two particularly interesting meetings during November. The first of these was held on November 19 at Kansas State College in Manhattan, Kan. The meeting was conducted in two sessions with an afternoon seminar addressed by F. J. Holzbaur, chief engineer of the Sugar Creek Refinery of the Standard Oil Company, on "Looking Forward."

E. E. Howard Principal Speaker

The evening session was started with dinner at the Manhattan Country Club and was followed with an address by E. E. Howard, member of the firm of consulting engineers of Ash-Howard-Needles and Tammen and chairman of the board of directors of the University of Kansas City. Mr. Howard's talk concerned

his recent trip to Berlin, Germany, to attend the International Engineering Conference. He spoke also of the engineering development and progress in Germany.

Mac Kappleman, student at the College, also spoke at the evening session, taking for his topic "Effect of Automobile Streamlining on Economy of Operation."

C. T. Thompson, student chairman of the Branch, presided at the meeting which was attended by 125 students and guests.

It is interesting to note that in recognition of the loyal support which members and students at Kansas State College always give the Kansas City Section meetings that fourteen members from Kansas City drove to Manhattan, Kansas, a distance of 125 miles to meet in joint session with the members of the Student Branch.

Joint Meeting With Other Sections

On November 24 members of the Kansas City Section of the A.S.M.E. joined with those of the A.I.E.E., A.S.C.E., A.S.H.&V.E., and A.C.S. in a joint meeting which was held at Edison Hall in Kansas City.

Over nine hundred were present at this meeting at which John Lyle Harrington, past-president A.S.M.E., presided, and A. L. Maillard, A. C. Kirkwood, and C. Earl Webb spoke.

The meeting was opened by William Wireme, president of the Engineers' Club of Kansas City, who introduced Mr. Harrington, a member of the firm of consulting engineers of Harrington and Cortelyou. Mr. Harrington, who served as chairman of the board of engineers to administer R.F.C. funds, explained the financial setup of the San Francisco-Oakland Bay Bridge project.

A. L. Maillard talked on the benefits to the societies of joint meetings of this nature, and A. C. Kirkwood read a letter from Dean Johnston of the University of Missouri commending the Kansas City Sections for their efforts toward a closer union of the engineering societies.

Following these talks, C. Earl Webb, division engineer, American Bridge Company, Chicago, gave a lecture on the San Francisco-Oakland Bay Bridge, illustrated by slides and followed by a sound picture made during the construction of this bridge.

Ed S. Smith, Jr., Chairman Subcommittee on Instruments

A NEW subcommittee on instruments of the Process Division of the A.S.M.E. was formed at the December, 1936, Annual Meeting of the Society, with Ed S. Smith, Jr., as chairman, and the following members: P. L. Keppler, W. K. McCoy, John J. Grebe, R. D. Webb, M. F. Behar, J. B. McMahon, M. J. Zucrow, John I. Yellott, and Albert Spitzglass. It is hoped that this group, interested in industrial instruments and regulators, will be able to crystallize its plans sufficiently to present a constructive program to the Division before the next Annual Meeting.

First Annual Exhibition of Photography by Engineers Held at Annual Meeting

THE First Annual Exhibition of Photography by Engineers was held in conjunction with the Annual Meeting, and was sponsored by the Photographic Group of the Metropolitan Section. Forty-seven prints from thirteen exhibitors were hung, and were viewed by a large number of those who attended the meetings. Pictures were received from members of the New York, Washington, D. C., Worcester, and St. Louis Sections. The entries were mainly of a pictorial and artistic rather than an industrial nature, although a number of the latter were on display. Not only did the exhibition add to the interest of the meeting, but it is also felt that it has again been demonstrated that an engineering training does not hamper artistic creative ability.

Although the present showing was frankly an experiment, and undertaken in a small way, the considerable success which it has met leads to the conclusion that a similar exhibition should be sponsored next year.

If sufficient entries were received to warrant it, separate displays of purely pictorial and of industrial subjects could be made and these further subdivided and hung by classifications. It is suggested that those who would be interested in exhibiting their work this coming year or have suggestions to make, send in their views to the headquarters of the Society.

A summary of comments recorded by visitors to the exhibit included several interesting suggestions and indicated those pictures most popular among spectators. Of these, the first four are as follows:

"Poise"	Lloyd R. Koenig
"In Memorian"	A. A. Markson
"Pattern"	J. A. Lucas
"The Last of the Whalers"	Walter C. Woodman

Contributors to the exhibition were Archibald Black, P. Cherdantzeff, John F. Guinan, Selby Haar, Sidney Jawitz, A. P. Johnson, Lloyd R. Koenig, L. J. Levert, J. A. Lucas, G. H. MacCullough, A. A. Markson, A. L. Williston, and Walter C. Woodman.

With the Student Branches

Branch Doings

ARMOUR BRANCH is making arrangements to schedule a joint meeting with the Junior Group of the Local Section of the A.S.M.E. in an attempt to close the gap now existing between the student and the graduate engineer. . . . . C.C.N.Y. BRANCH is making plans for an "Engineering Open House" to be held at the school on February 6. All A.S.M.E. members in New York City are invited to attend and inspect the engineering laboratories. . . . . NEWARK COLLEGE BRANCH reports that 110 members have been enrolled in the A.S.M.E. so far out of a possible 167 students eligible. Under the chairmanship of Joseph T. Bailey, this branch is making fine progress this year. . . . . NORTH CAROLINA STATE BRANCH was host to the members of the NORTH CAROLINA BRANCH and DUKE BRANCH at a joint meeting held in November. The visiting branches will act as hosts at two joint meetings to be held by each later in the school year. According to E. L. Guerrant, secretary of the NORTH CAROLINA STATE BRANCH, these joint meetings foster a spirit of cooperation and fellowship among the members of the participating branches. . . . . OKLAHOMA A. & M. BRANCH is making plans to act as hosts for the Southwest Conference in 1937. The members expect to make this conference one that will be remembered by all who take part in it. . . . . Two TEXAS TECH BRANCH members are planning to run a series of tests in the laboratory with both home-made and patent gas burners. The results obtained will be incorporated in a paper to be presented at the 1937 district student branch conference.

Trips and Inspections

NORTHEASTERN BRANCH members visited the Charleston Navy Yard. . . . . ARMOUR BRANCH made trips to the American Steel Foundry, Allis-Chalmers plant and the A. O. Smith plant. . . . . UNIVERSITY OF CALIFORNIA BRANCH inspected the Pan-American Airways Trans-Pacific base at Alameda, Cal. The members were fortunate in gaining access to one of the Clipper ships. The branch also inspected the San Francisco-Oakland and the Golden Gate bridges. . . . . CALIFORNIA TECH BRANCH observed both hand and machine methods in a local glass works. . . . . GEORGE WASHINGTON BRANCH went through the Naval Gun Factory and the National Archives building in Washington, D. C. The building contains the latest methods of air conditioning and when completed will house the Declaration of Independence, the Constitution of the United States, and other priceless documents which have to be protected against insects, dampness and exposure to light. . . . . M.I.T. BRANCH looked over a blast furnace. . . . . MICHIGAN STATE BRANCH were visitors to the Detroit Auto Show. . . . . MISSOURI BRANCH made a very interesting inspection of a fire-brick factory. Clifford Holt sent in a very interesting report about the trip, but much to our regret space is not available for printing it. . . . . PRATT BRANCH saw some very interesting experiments at the Electrical Appliance Laboratory in New York City. . . . . PRINCE

TON BRANCH visited the Bethlehem Steel Company plant. . . . . .RICE BRANCH made an 18-mile inspection trip of the Houston ship channel on the Port Commission's official launch. In visiting one of the Commission's grain elevators, about ten of the members suffered very painful injuries, when disregarding instructions, they insisted on using a staircase which was filled with wasp nests. . . . . .TEXAS UNIVERSITY students spent a whole week on inspection trips to various industries in and near Houston. . . . . .SANTA CLARA and STANFORD BRANCHES were others who had the pleasure of inspecting the San Francisco-Oakland bridge prior to its opening. . . . . .STEVENS BRANCH made an inspection trip to the Hoboken plant of the Keuffel & Esser Company and saw among many things the manufacture of slide rules. . . . . .TULANE and LOUISIANA STATE BRANCHES had a joint trip through the Baton Rouge plant of the Standard Oil Company. . . . . .VERMONT BRANCH visited a maple liquor-distillery plant. . . . . .WASHINGTON STATE BRANCH on a trip to Spokane visited an iron works and a newspaper-publishing office.

Talks by Student Members

Many interesting talks were given in the last few months by members of the student branches located in the various schools. . . . . BUCKNELL BRANCH; John Petherbridge talked on steam turbines. . . . . .COLORADO STATE BRANCH; Frank Sabec read a very interesting paper on coal mining and ventilation. . . . . ILLINOIS BRANCH; Roglis explained brass casting and rolling, Nolan told of his experiences on highway construction work, and Danielson recounted his work in helping to install an air-conditioning plant in the Kansas City Auditorium. . . . . .UNIVERSITY OF IOWA STATE BRANCH; talks were given by Kehrer on steel, Lortz on the kilowatt and Day on neutrality . . . . . .IOWA STATE BRANCH; William Shoemaker explained differential heating systems and S. Arthur Knapp talked on the use of the gun fire casing perforator for oil wells. . . . . KENTUCKY BRANCH; L. P. Bryant read a paper on storage batteries, M. Carter explained the standards for cast iron, Blunk reviewed the latest advances in television and Senior gave a very interesting talk on the spraying of molten metals based on an article in MECHANICAL ENGINEERING. . . . . .NEBRASKA BRANCH; Bill Hammond told his audience about the new 12-car Zephyr train and Dick Ostwald reviewed safety in the railroad industry. . . . . .NOTRE DAME BRANCH had John Davis talk on Diesel engines and Harold Heinemann on the application of engineering knowledge in four different industries. . . . . .OKLAHOMA A. & M. BRANCH members listened to a very interesting talk by Ernest Young on his experiences in the construction of a hi-pressure tank. . . . . .TEXAS BRANCH; John R. Ligon's talk was entitled "Boiler Installations". . . . . TEXAS TECH BRANCH had Lester Mueller present a paper on Diesel power and Charles Howell presented one on the construction difficulties of the San Francisco-Oakland bridge. . . . . VERMONT BRANCH was privileged to hear a talk by Elias Lyman on railroads, engines and schedules. . . . . .WASHINGTON STATE BRANCH had an original paper presented by Fred Stoltz on the burning of Washington coal in domestic boilers.

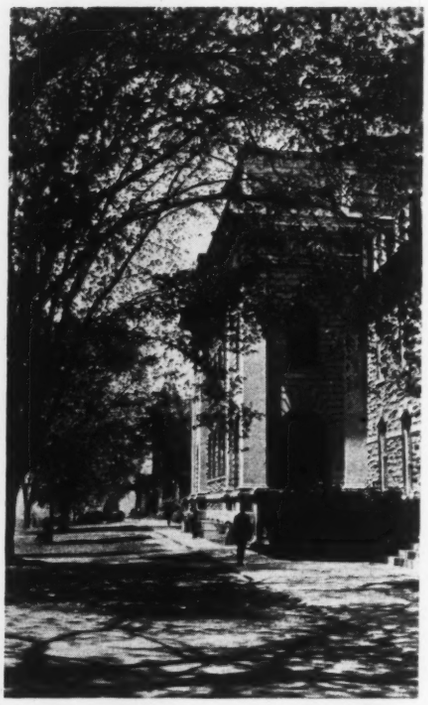
"FROM THE CASTLE PORCH, STEVENS TECH"
(Photograph by A. P. Johnson Shown at Annual Meeting Exhibit.)

Interesting Talks by Outsiders

ARMOUR BRANCH is very fortunate in having available for meetings, Dr. Thomas C. Poulter, second in command and senior scientist of the Byrd Antarctic Expedition. At a recent meeting, he demonstrated the manner in which hydrogen penetrates thick metals and glass under very high pressures. . . . . .PENNSYLVANIA BRANCH had a real "G-Man," Mr. A. Schroeder give a very interesting talk on his work . . . . . .PITTSBURGH BRANCH had Dr. Samuel Williams, faculty member, recount some of his experiences and contacts with engineers in Mexico, Haiti, Malayan Peninsula, and Rumania. At another meeting, Dr. R. T. Stewart, professor emeritus of the University of Pittsburgh, told of his travels in India, Japan, Hawaii, Panama, and Cuba.

This and That

James Brye, corresponding secretary of the CALIFORNIA BRANCH claims that student engineers are "all work and no play boys". . . . . MICHIGAN BRANCH held its annual student-faculty banquet, appropriately labeled the "Faculty Roast." This is an occasion to which the members look forward with a great deal of anticipation because it is the only opportunity for ribbing the engineering faculty members. . . . . .MINNESOTA BRANCH has a small terrier dog for its mascot. . . . . .Members of the PENNSYLVANIA BRANCH are utilizing the "Catalogue Studies" illustrated lectures. In this way, the members have an interesting technical presentation without too much preparation on the part of the speaker. These



"CORNELL CAMPUS"
(Photograph by R. Cherdantzeff Shown at Annual Meeting Exhibit.)

lectures with the projector and films are available in the engineering libraries. It is suggested by Herbert Bernstein, secretary of the PENN BRANCH that other branches give them a trial. . . . . WASHINGTON BRANCH invites prospective members to meetings with personal letters. . . . . .CORNELL BRANCH is working out a plan which will enable freshman and sophomores to join the A.S.M.E. as associate student members.

Missouri Branch Tries Personal-Rating Plan

MISSOURI BRANCH at one of its meetings tried out a personal-rating plan. Each member rated ten of his fellow members and then the completed papers were turned over to the man rated. By averaging the results, the man rated, obtained his personal rating. The men were rated on physical vitality, dress and personal habits, voice quality, power of expression, disposition and general cooperative ability, native ability, technical ability, vision, judgment and tact, self-evaluation, integrity, evidence of culture, refinement, leadership, industry, and responsibility, and initiative.

Texas University Building Observatory

Roy Rather, secretary of the TEXAS BRANCH, reports a talk given at one of the meetings by Professor Degler on the Texas University Observatory being built in the Davis Mountains in the western part of Texas. Because of its isolated location, a complete Diesel power plant and direct-current machinery are being installed. The observatory will be completed in the early part of 1937.

Committee on Relations With Colleges Meets With Honorary Chairmen of Branches, December 2

Roy V. Wright, Past-President of the A.S.M.E., Elected Chairman of the Committee for 1937

WITH Edward W. Burbank, of Dallas, Texas, presiding, the Committee on Relations With Colleges met with honorary chairmen of the Student Branches on Wednesday morning, December 2, during the Annual Meeting, reconvening in the afternoon and again on Thursday morning for discussion of Committee affairs.

The attendance at this morning Conference was double that of last year and interest in the discussion of the needs and activities of the Branches was such that the suggestion was made that next year more time be allotted to a similar session. Honorary chairmen present at this meeting included E. S. Ault (Case), H. F. Roemmele (Cooper Union), C. M. Merrick, III (Lafayette), B. H. Jennings (Lehigh), C. L. Svenson (M.I.T.), E. A. Fessenden (Rensselaer), F. L Wilkinson, Jr. (Tennessee), C. M. Chase (Tufts), E. L. Sussdorff (Vermont), A. F. Macconochie (Virginia), C. H. Coogan, Jr. (Pennsylvania), J. B. Baker (Drexel), F. L. Carvin (Newark), R. W. Angus (Toronto), J. I. Yellott, Jr. (Stevens), J. W. Zeller (Northeastern), S. R. Beitler (Ohio State), R. M. Barnes (Iowa), B. E. Short (Texas), G. J. Bischof (C.C.N.Y.), G. B. Thom (Swarthmore).

At the meeting of the Committee preceding the conference, Roy V. Wright, past-president, was chosen chairman for next year to succeed E. W. Burbank who becomes a member of the Council of the Society. The Committee also decided that a greater service could be rendered the Branches by adding to its personnel three advisory members to serve for one year, and recommended the appointment of Professors William J. Cope, University of Utah, R. L. Daugherty, California Institute of Technology, and R. H. G. Edmonds, University of Washington. Henry B. Fernald, Jr., will serve as junior advisor.

Present at the committee meeting were E. W. Burbank, R. V. Wright, F. V. Larkin, H. O. Croft, E. W. O'Brien, L. F. Zsuffa, Wm. Lyle Dudley, W. R. Woolrich, F. O. Ellenwood, W. W. Lawrence, and Ernest Hartford.

In the afternoon the committee reconvened to discuss an improved method of selecting prize winners at the annual student group meetings. It was decided to experiment with the Group I meeting to be held in April and Professor Ellenwood of Cornell was asked to take charge of the matter of working out a more satisfactory system than the present one.

There is no doubt but that the number of student members enrolled this year will exceed four thousand and to meet the need of the Branches in arranging more and better meetings, the Committee took what it hopes will be the first step toward increasing the appropriations for Branch operation. Therefore, the following schedule of appropriations has been adopted, effective immediately: For Branches with 15 to 50 members, $25; with 51 to 100 members, $25, plus fifty cents a member for each member beyond the number of 50; with 101 members and over, $50 plus twenty-five cents a member for each one beyond the number of 25.

Dr. Edward Weston Leaves Scientific Books to Newark College of Engineering

A COLLECTION of more than 15,000 volumes, one of the largest private scientific libraries in the country, which belonged to the late Dr. Edward Weston, is now the property of Newark College of Engineering.

The gift is one of the bequests of the electrical pioneer and inventor to the college which he helped to establish and which he served as a member of the first and subsequent boards of trustees.

Other gifts to the college from Dr. Weston's estate are his scientific and technical apparatus, and drawings, sketches, and material related to his original discoveries and inventions. A sum sufficient to provide for housing and maintenance of the library is likewise included.

Commenting on the gifts, Allan R. Cullimore, president of the college, said: "Intrinsically, the donations are very valuable to us as supplementing our laboratory equipment in a way that is vital and necessary to our continued growth and development. Every department of the institution will feel the effect in the increase of its specialized technical equipment.

Dr. Weston, a member of the A.S.M.E. since 1882, died on August 20, 1936. He was chairman of the board of the Weston Electric Instrument Corporation, Newark, N. J.

What Rose Graduates Are Doing

IN THE November issue of *Rose Technic*, Donald B. Prentice, president, Rose Polytechnic Institute, reports on studies made of statistics of 1271 out of 1389 graduates of that institution, and compares the results with those obtained by a study of all engineering graduates made by the S.P.E.E.

The occupational distribution of 1271 Rose graduates including all classes from 1885 to 1935 shows the following percentages: Nontechnical 6.3, teaching 3.5, general engineering 49.2, engineering administration 21.5, general administration 8.7, consultants 5.6, industry and business 4.2, and graduate students 1.0. The S.P.E.E. report, which was made prior to the depression, showed that 14.8 per cent of engineering graduates were in non-engineering work. Comparing data of the S.P.E.E. on graduates 15 years and more out of college with corresponding groups in consulting work showed S.P.E.E. 8 per cent, Rose 9.8 per cent, and in administrative and managerial positions S.P.E.E. 45.8 per cent and Rose 48.5 per cent.

Turning to the report of the United States Bureau of Labor Statistics published in MECHANICAL ENGINEERING for August, 1936, Dr. Prentice shows the following comparisons:

Field of employment	*Per cent of total* Rose	U.S.B.L.S.
Construction	2.0	9.6
Public utilities	11.2	11.8
Transportation	5.5	3.5
Manufacturing and mining	53.4	35.5
Government	11.5	31.5

Type of work	*Per cent of total* Rose	U.S.B.L.S.
Consulting	6.1	6.4
Teaching	3.9	5.9
Sales	11.0	4.5
General administration and management	9.4	8.3

Student Luncheon at Annual Meeting Well Attended

Talks by E. W. Burbank, W. L. Batt, and J. H. Herron

MORE than 120 student members and senior members attended the Student Luncheon held on Wednesday, December 2, making this affair an outstanding event in the 1936 Annual Meeting program.

E. W. Burbank, chairman of the Committee on Relations With Colleges, acted as toastmaster and presented President W. L. Batt as the first speaker. Mr. Batt, who has recently visited many of the student branches, emphasized the value of A.S.M.E. membership to the young engineer and stressed particularly the training that holding office in the student branch offers. Such activity, if entered into wholeheartedly, prepares for future responsibilities in the Society and in the business world.

The president-elect, J. H. Herron, endorsed Mr. Batt's views and stated that he would soon start an extensive tour in the course of which he hoped to visit many student branches.

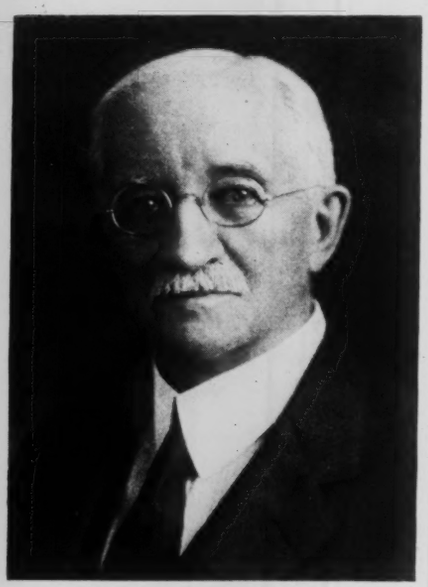
It was announced at the luncheon that Leon B. Stinson of Oklahoma Agricultural and Mechanical College had received the Undergraduate Award for his paper "Polymerized Motor Fuels—Their Economic Significance" and that DeWitt C. Barlow, Jr., of Princeton University had received the Postgraduate Award for his paper "The Critical Speeds of Lateral Vibrations of Shafts With Gyroscopic Effect." Mr. Stinson's award was presented at Honors Night. Mr. Barlow, away on his honeymoon, was notified by telegram.

Other Engineering Activities

Prof. A. N. Talbot Awarded John Fritz Medal for 1937

ARTHUR NEWELL TALBOT, professor emeritus of engineering in the University of Illinois, has been awarded the 1937 John Fritz Gold Medal, highest of American engineering honors. Professor Talbot, who is 79, was cited as "molder of men, eminent consultant on engineering projects, leader of research, and outstanding educator in civil engineering."

The award is made annually for notable scientific or industrial achievement by a board composed of sixteen past-presidents of the four national societies of Civil, Mining and Metallurgical, Mechanical, and Electrical Engineers.



ARTHUR NEWELL TALBOT

Professor Talbot was born in Cortland, Ill., on October 21, 1857. He received the degree of bachelor of science from the University of Illinois in 1881, and the degree of civil engineer in 1885. Honorary degrees were conferred on him by the University of Pennsylvania in 1915, the University of Michigan in 1916, and the University of Illinois in 1931. He has been engaged in engineering work since 1881, his activities embracing railroads, roads, bridges, buildings, and municipal public works.

In 1885 he joined the Illinois faculty as assistant professor of engineering and mathematics. In 1890 he was appointed professor of municipal and sanitary engineering in charge of theoretical and applied mechanics. He became professor emeritus in 1926.

Professor Talbot aided in the upbuilding of the University's testing laboratories and the College of Engineering. He has been active in the formation and development of the Illinois Engineering Experiment Station, in connection with which he has made numerous investigations in the properties of steel, brick, concrete and reinforced concrete, and in water purification, sewage treatment, and hydraulics.

He has also directed studies sponsored by the American Society of Civil Engineers and the American Railway Engineering Association. For outstanding research in railroad track stresses he was awarded the plaque of the Association. He still continues his research at the University of Illinois.

Professor Talbot has been president of the American Society of Civil Engineers, the Society for the Promotion for Engineering Education, and the American Society for Testing Materials, and is a member of many other professional organizations. He received the Washington Award in 1924, the Turner Medal in 1928, the Henderson Medal of the Franklin Institute in 1931, and the Lamme Medal of the Society for the Promotion of Engineering Education in 1932. He is the author of many technical articles, and has contributed to professional journals.

Among the recipients of the Medal have been Lord Kelvin, Thomas Edison, Guglielmo Marconi, Elihu Thomson, John R. Freeman, John F. Stevens, Elmer A. Sperry, Daniel C. Jackling, M. I. Pupin, J. J. Carty, J. Waldo Smith, Frank Julian Sprague, and William Frederick Durand.

The Fortieth Anniversary of Diesel Engine

THE fortieth anniversary of the introduction of Diesel power into the United States was observed by a group of 300 industrialists and engineers at a luncheon on December 2, 1936, at the Waldorf-Astoria, New York, arranged by the Diesel Committee of the Exposition of Power and Mechanical Engineering.

The purpose of the luncheon was to arouse public interest in the importance of the Diesel-engine industry in the United States. Dr. Rudolph Diesel, who invented the type of internal-combustion engine manufactured by the industry, was made an honorary member of The American Society of Mechanical Engineers on the occasion of one of his visits to this country.

At the luncheon the toastmaster was Gordon Rentschler, president of The National City Bank of New York. John B. Kennedy, radio commentator, delivered an address based on the work of Doctor Diesel and the development and growth of the Diesel-engine industry, and reported the impressions he formed on a recent tour of inspection of Diesel manufacturing plants from coast to coast.

Following his address, Mr. Kennedy acted as announcer of the other speakers whose brief addresses were broadcast over a nation-wide network. Those participating in this program were: Edward B. Pollister, president, Busch-Sulzer Brothers Diesel Engine Company; Capt. Edward V. Rickenbacker, vice-president, Eastern Air Lines; Col. R. H. Morse, president, Fairbanks-Morse and Company; Thomas H. Beck, president, Crowell Publishing Company; C. L. Cummins, president, Cummins Engine Company; Edward G. Budd, president, Edward G. Budd Manufacturing Company; Prof. R. U. Blasingame, president, American Society of Agricultural Engineers; David S. Sarnoff, president Radio Corporation of America, speaking from Chicago; B. C. Heacock, president, Caterpillar Tractor Company; and Charles F. Kettering, vice-president in charge of research, General Motors Corporation, speaking from Detroit.

A.S.A. Holds Annual Dinner Meeting

HENRY I. HARRIMAN, just returned from a series of international conferences abroad, took the European situation and its application to America's problems as text for his address at the Annual Dinner Meeting of the American Standards Association, December 9, 1936, at the Hotel Astor, New York. Mr. Harriman, chairman of the board of the New England Power Association, is a former president of the Chamber of Commerce of the United States, and is a member of the Advisory Committee of the American Standards Association, which serves as the national clearing house for standardization and safety-code work in this country.

Prior to the address, Dana D. Barnum, president, Boston Consolidated Gas, reviewed the Association's work for the year. "Industry and government have reached a high degree of cooperation in their numerous joint activities in the American Standards Association," Mr. Barnum said, using as an illustration the 40 industrial safety codes, now the backbone of state regulations for the protection of workers in this country.

During the year the Association approved 33 new standards and 33 revisions of standards previously adopted. This brings the total of American Standards to 357 in the fields of civil, mechanical, and electrical engineering, metallurgy, chemistry, textiles, oil, and paper and other industries.

Marking virtual completion of a project started in 1927, new American standards approved this year now classify coals from peat to anthracite. This undertaking, which will make possible the scientific purchase of coal, is by far the most comprehensive of the kind ever carried out, and represents $100,000 in research spent by the United States and Canadian governments alone.

Three new standards in the field of sound measurement and nomenclature of sound will prove valuable to both engineers and musicians. One of these has resulted in a new "noise meter" to measure the sound of typewriter or pneumatic drill. It may also be used in music studios to teach singers how to place their voices most effectively for radio, movie, and concert work. Before this specification became available there were five

meters on the market the results of which were in no way comparable.

An international standard for 16-mm sound film now provides for complete interchangeability of this size film and equipment throughout the world, ending a two-year controversy between European and American manufacturers with universal adoption of the American practice.

Increased attention to problems of traffic safety during the year have resulted in various new projects. Safety standards for busses and trucks, which were developed last winter at the request of the Interstate Commerce Commission, have since been used by that Commission as a basis for public hearings. Standard specifications for safety glass have been developed, and work is under way on standards to determine the "roadability" of motor vehicles.

Mr. Barnum announced that five national organizations have joined the Association during the year, a striking indication of industry's confidence in the work. This brings the total membership of the American Standards Association to 56 national organizations, including technical societies, trade associations, and departments of the federal government, and some 1800 companies. The new members are: Industrial Safety Equipment Association, Metal Lath Manufacturers Association, National Association of Motor Bus Operators, Association of Gas Appliance and Equipment Manufacturers, American Gear Manufacturers Association.

Officers elect are: Dana D. Barnum, president, Consolidated Gas Company, Boston, president (reelected), and Edmund A. Prentis, of Spencer, White & Prentis, Inc., New York, vice-president (reelected).

The Engineering Aspects of Industrial Air Pollution

THE report of the preventive engineering committee of the Air Hygiene Foundation, written by Prof. Philip Drinker of Harvard, chairman, and other technical specialists on the committee, advises that engineers in the "dusty trades" can and should cut heavy dust concentrations below the present limits warranted by medical knowledge. This action is important, the report explains, not only to further safeguard the health of workmen but to give employers the maximum protection against unjust claims.

Discussing methods of determining dusts, the report states that present dust-sampling and dust-estimating methods undoubtedly will be amended and changed from time to time in the light of new knowledge and further experimentation. Where dust control alone is in question, the use of simplest possible procedure which will give the necessary information, is recommended.

The report included a table giving latest available information on the minimum air velocities necessary in certain industries to insure the maintenance of dust concentrations at safe levels.

The preventive engineering committee asserts that many firms have neglected heavy dust concentrations in cases where the dust is of no proved harm, and adds:

"There is no satisfactory medical answer at present to this question, but the engineer is making a mistake if he lets men breathe heavy dust concentrations of any material. If no other reason for dust control can be found, then one should read transcripts of some of the recent suits at common law in which fantastic damages for alleged silicosis were granted to men who breathed dust containing little or no silica. The courts and compensation boards are not impressed with subtle distinctions between dusts with 10 per cent and 40 per cent quartz, especially when medical experts are reluctant to make definite statements as to the comparative significance of such differences.

"It would be well to realize that men working in dusty trades suffer far more from respiratory troubles of all kinds than do men who work in clean air. The evidence that excessive dustiness of any kind is harmful is beyond argument."

The committee attributes the handicap in this general field to the lack of fundamental data and recommends a number of specific engineering researches for the Foundation to undertake in the coming year.

Besides Professor Drinker, other members of the Foundation's preventive-engineering committee are Dr. J. M. Dallavalle, U. S. Public Health Service; Theodore F. Hatch, New York State Department of Labor; H. M. Nichols, Hyde Park, Mass.; S. C. Vessy, Cleveland, Ohio; and William P. Yant of Pittsburgh, formerly connected with the U. S. Bureau of Mines.

S.P.E.E. Middle Atlantic Section Holds Meeting December 5, at Columbia

THREE HUNDRED members of the Middle Atlantic Section of the Society for the Promotion of Engineering Education met on December 5, at Columbia University, New York. The committee on arrangements was under the chairmanship of J. W. Barker, dean, School of Engineering, Columbia. Frank L. Eidmann, of Columbia, is chairman of the Middle Atlantic section. Both Dean Barker and Professor Eidmann are members of The American Society of Mechanical Engineers.

Following registration beginning at 9:30 a.m. a number of guided tours to points of interest on the Columbia campus and nearby landmarks engaged the visitors until luncheon which was served at the Men's Faculty Club.

At the afternoon technical and business session, held in the Harkness Academic Theater, Dean Barker extended the greetings of the University, and Professor Eidmann introduced Harry J. Carman, professor of history, and Horace Taylor, professor of economics, Columbia, whose paper "The Humanistic Content of the Engineering Curriculum—An Example of an Integrated Program," was the feature of the afternoon's program.

The paper described the courses in Contemporary Civilization given to all second-year undergraduates of the University and hence to students in engineering courses. Prepared and extemporaneous discussions provided numerous well-reasoned points of view on general courses similar to those described by the authors.

A committee appointed to draft a minute to the memory of Robert I. Rees, past-president of S.P.E.E., was read, and on motion a copy was ordered sent to Mrs. Rees.

Following this session the visitors were divided into small groups for the purpose of making tours of inspection of the engineering laboratories.

At the dinner, which was held in the Men's Faculty Club, Dean Barker acted as toastmaster. The committee appointed to choose a meeting place for the spring of 1937 announced that Rutgers' invitation had been accepted.

Officers for 1937

The following officers for 1937 were elected: Chairman, R. L. Spencer, dean of engineering at the University of Delaware; vice-chairman G. K. Palsgrove, of Rensselaer; secretary-treasurer C. D. Fawcett, of the University of Pennsylvania.

F. L. Bishop, secretary, S.P.E.E., spoke briefly of the importance of the sections of the Society, and H. P. Hammond, president, S.P.E.E., brought the greetings of the Society and described its growth and vigor. He spoke of President Roosevelt's recent letter to engineering colleges in which he pointed out the desirability of developing courses to emphasize the importance of the social implications of the engineer's work and read a reply he had addressed to the President in behalf of S.P.E.E.

President Butler's Address

Dean Barker next introduced Columbia's accomplished and distinguished president, Nicholas Murray Butler, who delivered a thoughtful, scholarly, and eloquent address.

Doctor Butler began by alluding to intellectual, ethical, and moral conflicts, which had waged over Europe during the past 2000 years. He showed that these conflicts had given place to a later one which took the form of movements in nation building, out of which the present unrest in western Europe has grown. Today's problems, he said are international, and for a century to come the engineer will be the key man in the problems of civilization. A number of avenues of useful activity, such as food supply, public health, conservation, use of leisure, extension of transportation and communication, were mentioned as typically engineering in character. The interruption of the trend of democracy by the ascendency of dictatorships, he said, was engaging the attention of the civilized world, and old problems

were being supplemented by new ones. In the solution of these problems the engineer would play an important part. The world will turn to him, said Doctor Butler, and the future of civilization depends on the use he makes of his opportunities. Hence he must be an educated man and need instruction in history, philosophy, and literature. Furthermore, he concluded, men who are not to be engineers must be given a general course in what engineering is about; and it remains to give to the public a sense of the meaning of engineering.

Following Doctor Butler's address, which was warmly applauded, James K. Finch, Renwick professor of civil engineering at Columbia, talked on "Here and There in the History of Engineering." He recalled Trautwine's opinion, as late as 1871, of the engineer's limited necessity to understand mathematical subjects and Doctor Butler's definition of engineering as the application of means to material ends within the bounds of economic law. He then recounted numerous instances of personal records left by engineers of antiquity and the middle ages in their writings and in lapidary inscriptions on their works.

DR. JACOBUS RECEIVES THE MOREHEAD MEDAL

(Philip Kearny (right), past-president of the International Acetylene Association, presents the Morehead Medal to Dr. David S. Jacobus while C. O. Epperson, President of the Association, looks on. The award took place at the 37th Annual Convention of the International Acetylene Association held recently in St. Louis.)

Annual Report of The Engineering Foundation

THE annual report of The Engineering Foundation for the fiscal year ending September 30, 1936, was presented at the annual meeting of the United Engineering Trustees, Inc., October 22, 1936.

Capital funds of the Foundation are reported as endowments having a total book value, September 30, 1936, of $870,000. The net income from endowment was $34,126 for the fiscal year. The E. H. Henry bequest in the hands of executors until the decease of two life beneficiaries, at probate of will in 1931, is approximately $400,000.

Activities Aided

Activities aided by the Foundation during ts fiscal year ended September 30, 1936, comprised: *Earths and Foundations Research*, continued by the American Society of Civil Engineers. *Alloys of Iron Research*, sponsored by American Institute of Mining and Metallurgical Engineers. *Barodynamic Research* (study of weighty masses by means of special centrifuges) with application to mining and civil-engineering problems, sponsored by American Institute of Mining and Metallurgical Engineers. *Cottonseed Processing Research*, by a committee of The American Society of Mechanical Engineers. *Cutting Fluids* (for lubricating and cooling metal-cutting tools), The American Society of Mechanical Engineers. *Critical Pressure Steam Boilers:* A basic investigation by a research committee of The American Society of Mechanical Engineers. *Fluid Meters.* Long-radius flow nozzles, one of the primary elements used in fluid meters, are being studied experimentally by a committee of The American Society of Mechanical Engineers. *Boiler Feedwater Research* was continued by a committee of The American Society of Mechanical Engineers. *Strength of Gear Teeth:* This experimental study has been in progress twelve years under supervision of a committee of The American Society of Mechanical Engineers. *"Cutting of Metals" Handbook.* Manuscript for this book of approximately 250 typewritten pages has been completed by a special editor engaged by The American Society of Mechanical Engineers. *Welding Research:* (*a*) Pure Iron Electrodes, sponsored by American Institute of Electrical Engineers. (*b*) Welding Research Committee, sponsored by American Institute of Electrical Engineers and American Welding Society. *Engineers' Council for Professional Development:* Composed of representatives of the Founder Societies, Society for Promotion of Engineering Education, American Institute of Chemical Engineers and National Council of State Boards of Engineering Examiners. *Personnel Research Federation:* Forms of Employer-Employee cooperation: By visits to industrial plants, by correspondence with governmental departments and labor organizations, and by conferences, materials were collected for a report of practical usefulness showing the development of employer-employee cooperation to date and the ways in which this method of industrial management may develop further. *Plastic Flow of Concrete:* University of California, Engineering Laboratories. *Concrete Research.* The Planning Committee on Cement and Concrete Research reported in August, 1936, the opinion "that there is a real need for a broad and comprehensive program of cement and concrete research and that The Engineering Foundation might well be the organization to promote such a program." The Committee recommended "the appointment of a standing Committee on Cement and Concrete Research, the membership of which shall include representatives of national organizations having interests in this field." The Director of the Foundation is collecting data and opinions from a number of other sources to aid in the further preliminary examination of this proposal during the coming year. *Plasticity of Metals:* Creep and Relaxation, under agreement with University of Pittsburgh; research facilities provided in Westinghouse Research Laboratories. *Defects and Failures of Metals:* An informal proposal for a book was examined.

Foundation Joint Research Board

The Engineering Foundation Board is the joint research board of the four American societies of Civil, Mining and Metallurgical, Mechanical, and Electrical engineers, whose sphere includes technological utilization of the sciences together with development of engineering elements of economics, ethics, sociology, government and education, for the benefit of society as a whole.

The ultimate objective of the Foundation is the advancement of engineering as a most important instrumentality for bringing men of all nations into intimate contact or communication, for supplying them the requisites of a constantly developing enjoyment of life, and, consequently, for maintaining peace and progress. The Foundation's immediate objective is the furtherance of researches by its Founder Societies and other engineering organizations directed toward solutions of problems of benefit to the profession or the public, of technological or human interest, in which engineering methods and knowledge may be utilized.

(*Continued on page 64*)

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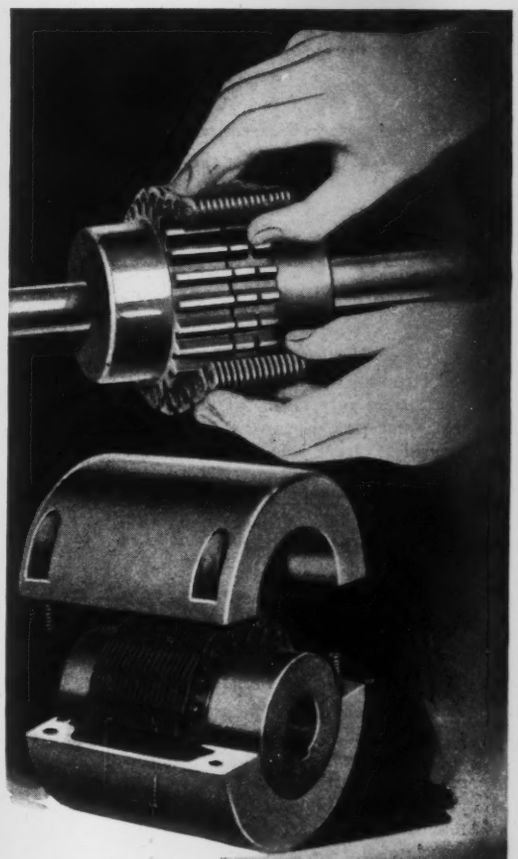

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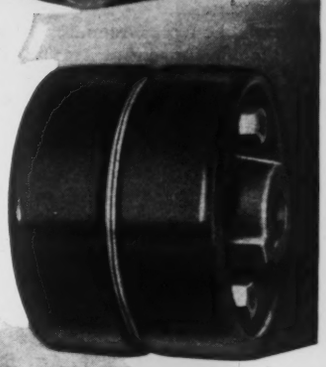
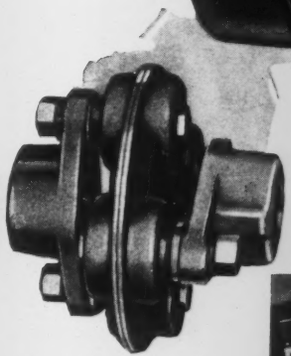


Above: MORFLEX coupling with case in position.



Left: MORFLEX rubber-bushing type flexible coupling.

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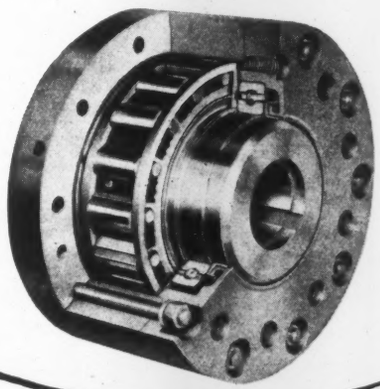

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The News From Washington

By American Engineering Council

Government Agencies Activities

BUREAU OF labor statistics reported in September that average hourly wages in the building trades had reached the highest figure since July, 1933. The average for the three-year period was 0.662, and the lowest monthly average was 0.528 in October, 1933. It also shows that reports from all 48 of the PWA state offices indicate an average pay on both federal and nonfederal programs of 0.776 during September, 1936.

The Bureau of Public Roads announced the initiation of a study in November of the causes of highway accidents and conditions contributing to them. It is being made under the Act of Congress of June, 1936, authorizing an expenditure of $75,000. The results of the survey are expected to serve as a basis for future safety legislation. Those in charge of the work will be assisted by a strong advisory committee of representatives from other governmental bureaus, universities, research foundations, safety councils, and automobile associations.

Public Works Administration has announced the appointment of Arthur S. Tuttle as PWA project engineer for the new $58,000,000 Queens Midtown Tunnel in addition to his duties as Director of the Public Works Administration in New York State. Secretary Ickes has publicly congratulated Mr. Tuttle on his outstanding three-year record as a State Administrator handling 400 large projects in that state program. Mr. Tuttle, who was formerly chief engineer for the Board of Estimate and Apportionment in New York City, is president of the Engineers' Club of New York, past-president of the American Society of Civil Engineers and active in American Engineering Council.

During November, PWA announced the allotment of $2,760,000 to the Imperial Irrigation District of El Centro, California, for the construction of the first unit of the All-American Canal Power Project. The Power Canal was contemplated in the Boulder Canyon Project Act. It will extend 80 miles to tap the Colorado River 15 miles north of Yuma, Arizona. The water-power potentialities include four power sites capable of generating a relatively large amount of electrical energy for the Imperial Valley which is now served by the Southern Sierra Power Company, a subsidiary of the Nevada California Electric Corporation. Since July, 1936, the Public Works Administration has made 1805 allotments for projects estimated to cost $268,820,909 of which grants are $121,519,435 and loans are $13,894,600.

The U. S. Department of Agriculture announced in November that the farmer's cash income from farm marketings amounted to $5,224,000,000 for the first nine months of 1936. This was a gain of 18 per cent over the total for the same period in 1935. All regions showed gains ranging from 13 per cent in two Southern regions to 26 per cent in West North Central States. Kentucky was the only state showing a decrease. West Virginia and Montana hold without material change. Maine showed a gain of 80 per cent, due largely to the increase in income from potatoes.

Works Progress Administration officials have little to say about the future. It is a fact, however, that the trend of thought and action is toward retrenchment and the reduction of overhead expenses. WPA officials are making a nation-wide survey with the object of curtailing expenses to the degree that the need for relief has diminished. Cuts are expected in administrative personnel and among nonrelief workers where they wil entail minimum hardship and be most effective from the viewpoint of economy.

Unofficial reports indicate dismissals before January 1 running up to 175,000. Of that number, 20,000 are expected to be nonrelief workers and some 5000 administrative employees. In that connection, it is interesting to note that only one out of every 93 persons working on relief projects is an administrative employee, and that dismissals are likely to be about 1 in 35.

Engineering Employment Situation

At no time in recent history has there been so much genuine interest in the use of a merit system in government service. The Administration is said to encourage a "career service" to settle the more efficient of "the faithful" into places of influence. Administrative officers welcome it as a means of freeing themselves from personnel difficulties and inefficiency forced upon them by patronage, and employees who prefer government work hope to find it in the opportunity to prove their fitness for permanent positions. The Civil Service Reform League, American Public Welfare Association, the several organizations of government employees, and the professional groups as well as the general public all seem equally enthusiastic about the possibilities of substituting personal merit for political or social preference in the selection of public employees.

Council's committees are being informed of this activity and of the related opportunity to improve the economic status of engineers in national, state, and local government service by supporting the merit system. The staff is using its contacts with Congressional Committees, the Civil Service Commission, and the Civil Service Reform League to promote the universal adoption of the merit system in the form of an expansion of Civil Service to include a more effective career service. In that connection, we suggest that all engineers in government service and the general public welfare may benefit from publicity given the current campaign for legislation to substitute fitness for political preference.

In the meantime, the elimination process is quietly moving thousands of emergency employees including hundreds of engineers into other activities. Personal politics and "social mindedness" still play their part in the selection of employees, but most administrative and personnel officers in Washington are displaying an encouraging disposition to fill vacancies with people possessed of proper qualifications, with preference for those of experience.

Engineers to Hear About N. Y. 1939 World Fair

AN unusually interesting meeting will be held in the auditorium of the Engineering Societies Building on Friday evening, January 8, at eight o'clock, when the Metropolitan Sections of the A.S.M.E. and A.S.C.E., the New York City Post of the Society of American Military Engineers, the Municipal Engineers of the City of New York, and the New York chapter of the American Society of Landscape Architects join in presenting the general and engineering aspects of New York's World Fair.

The first speaker of the evening will be Grover A. Whalen, president of New York's World Fair, 1939, Inc., who will be followed by S. F. Voorhees, member A.S.M.E., and chairman of the board of design for the Fair. The engineering aspects of the Fair will be described by Col. J. P. Hogan, chief engineer, member, A.S.M.E. The talks will all be illustrated with lantern slides.

These speakers, men so eminently qualified to present the subject, will provide at this meeting a most interesting description of the nature and magnitude of this project and a discussion of the problems involved.

Local Sections

Coming Meetings

Akron-Canton: January 14. Dinner at 6:30 p.m. Meeting at 7:30 p.m. at the Y.M.C.A., Akron, Ohio. Subject: "Glass Making," by R. A. Miller, technical sales engineer, Pittsburgh Plate Glass Company.

Baltimore: January 14. Maryland Hall, Johns Hopkins University, Baltimore, Md. Subject: "Automatic Flight," by Elmer Sperry, Sperry Gyroscope Company. Mr. Sperry will give an illustrated lecture with models on automatic flight, blind flying, and directional control of airplanes.

Cleveland: January 28. Hotel Statler at 8:00 p.m. Subject: "Symposium on Speci-

(*Continued on pag 66*)

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